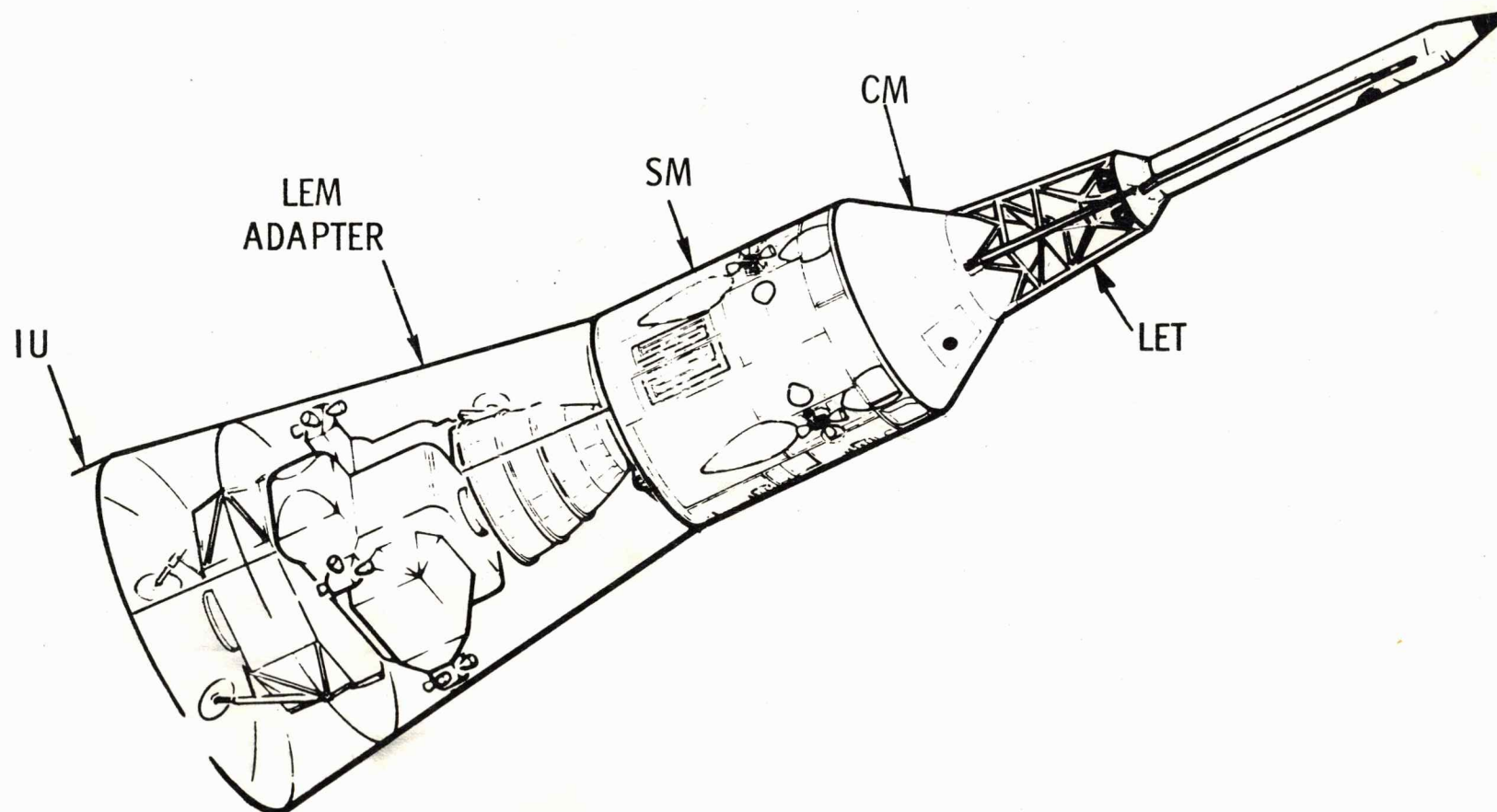


# APOLLO SPACECRAFT SEPARATION PLANES

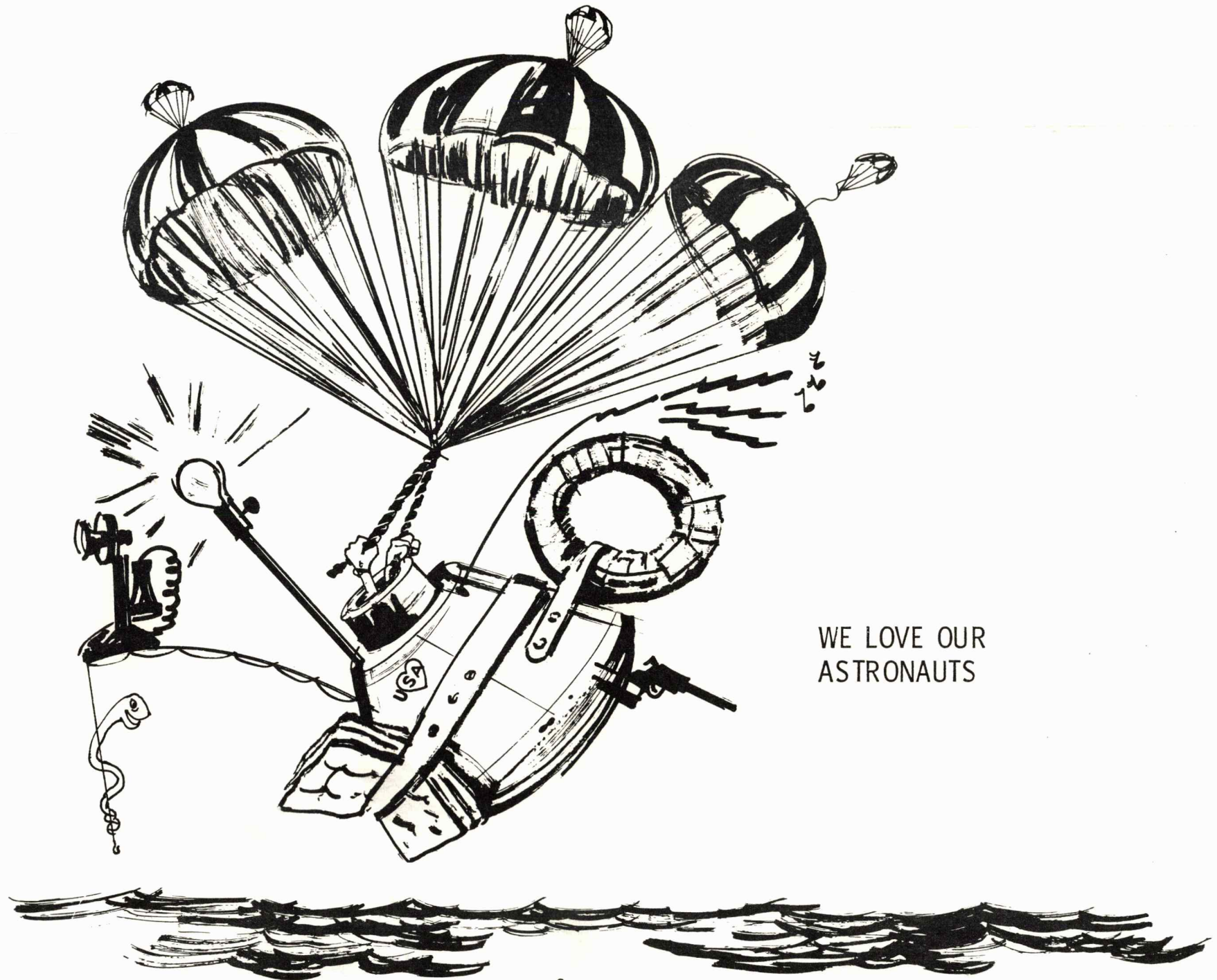
H. DUNHAM  
11/16/65



## LES, ELS AND SEQUENCERS

<u>ICD NUMBER</u>	<u>TITLE</u>
MH01-05212-224	SLA/LEM SEP. SYS. UMBIL. ELECT.
MH01-05213-124	SLA/LEM SEP. SYS. UMBIL. MECH.
MH01-05214-414	SLA/LEM SEP. SYS. FUNC.
*BOM90503	FLIGHT MECHANICS PANEL INTERFACE CONTROL DOCUMENT FOR SATURN V/BLOCK II SC
13M50312	SC TO "Q" BALL PHYSICAL REQUIREMENTS
13M60004	EMC CRITERIA, APOLLO/SATURN
*4OM37521	SA-505/SC-104 ELECTRICAL INTERFACE

\*Not signed as of 10/29/65



WE LOVE OUR  
ASTRONAUTS

## OUTLINE

- PURPOSE
- REQUIREMENTS
- SUBSYSTEM DESCRIPTION

MAJOR COMPONENTS  
PICTORIAL SCHEMATICS  
EVENTS SEQUENCE  
FUNCTIONAL SCHEMATICS (APPENDIX)

- DESIGN IMPLEMENTATION

DRAWING TREE  
SPECIFICATIONS  
ICD'S

- PERSPECTIVES



## ERS PURPOSE

- PROVIDE MEANS TO STABILIZE & DECELERATE CM FOLLOWING ENTRY OR ABORT, & PROVIDE VELOCITY & ATTITUDE AT EARTH IMPACT COMPATIBLE WITH IMPACT REQUIREMENTS
- PROVIDE ACCEPTABLE CREW ACCELERATIONS UPON IMPACT & AN ACCEPTABLE ENVIRONMENT FOR 48 HOURS FOLLOWING IMPACT
- PROVIDE PROVISIONS FOR LOCATING & RETRIEVING CM FROM SEA

ERS REQUIREMENTS SUMMARY

BASIC REQUIREMENTS OF THE ERS ARE SUMMARIZED. EARTH LANDING, IMPACT, FLOTATION, LOCATING AND RECOVERY FUNCTIONS ARE COVERED.

## ERS REQUIREMENTS SUMMARY

- STABILIZE & DECELERATE CM FOLLOWING ENTRY OR ABORT
- PROVIDE VELOCITY & ATTITUDE COMPATIBLE WITH IMPACT REQUIREMENTS
- OPERATE SATISFACTORILY WHEN ONE DROGUE AND/OR ONE MAIN CHUTE FAILS
- OPERATE AUTOMATIC WITH MANUAL BACKUP
- INSURE ACCEPTABLE CREW ACCELERATIONS UPON IMPACT
- INSURE VEHICLE FLOTATION IN UPRIGHT ATTITUDE
- PROVIDE ANTENNAS & VISUAL LOCATING AIDS
- PROVIDE RECOVERY LIFTING LOOP

## MAJOR COMPONENTS

MAJOR COMPONENTS OF THE ERS ARE OUTLINED. THEY WILL BE DEPICTED ON LATER CHARTS. IT MAY BE NOTED THAT THE ERS IS NOT A SUBSYSTEM UNTO ITSELF, BUT CONSISTS OF THREE ESSENTIALLY COMPLETE AND TWO PARTIAL SUBSYSTEMS.



## MAJOR COMPONENTS

### EARTH LANDING SEQUENCE CONTROLLER

### PARACHUTES & RELATED EQUIPMENT

- DUAL DROGUES, MORTARS
- THREE MAINS, PILOTS, MORTARS
- REEFING LINES & CUTTERS
- DROGUE & MAINS DISCONNECTS

### EARTH IMPACT

- FOUR CRUSHABLE RIBS
  - EIGHT ATTENUATION STRUTS
  - CREW COUCHES
  - CM STRUCTURE
- } CM STRUCTURE SUBSYSTEM

### FLOTATION/UPRIGHTING

- BAGS
- PUMP, LINES, VALVES
- CONTROLS

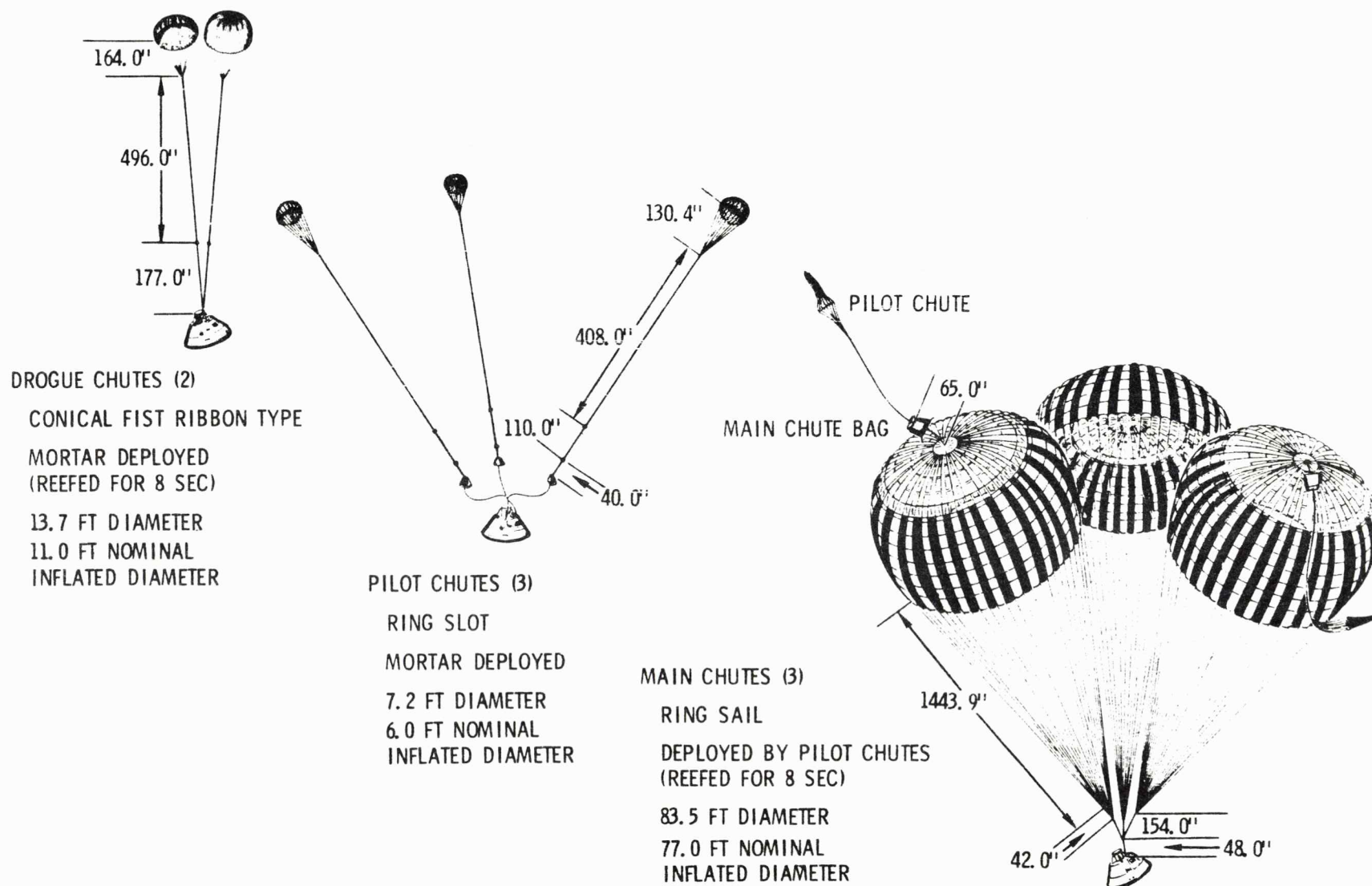
### POSTLANDING LOCATION & RECOVERY AIDS

- ANTENNAS
- FLASHING LIGHT
- SEA MARKER
- SWIMMER UMBILICAL
- LIFTING LOOP

EARTH LANDING SYSTEM PARACHUTES

THE EARTH LANDING SYSTEM PARACHUTES AND DEPLOYMENT SEQUENCE ARE DESCRIBED.

## EARTH LANDING SYSTEM PARACHUTES

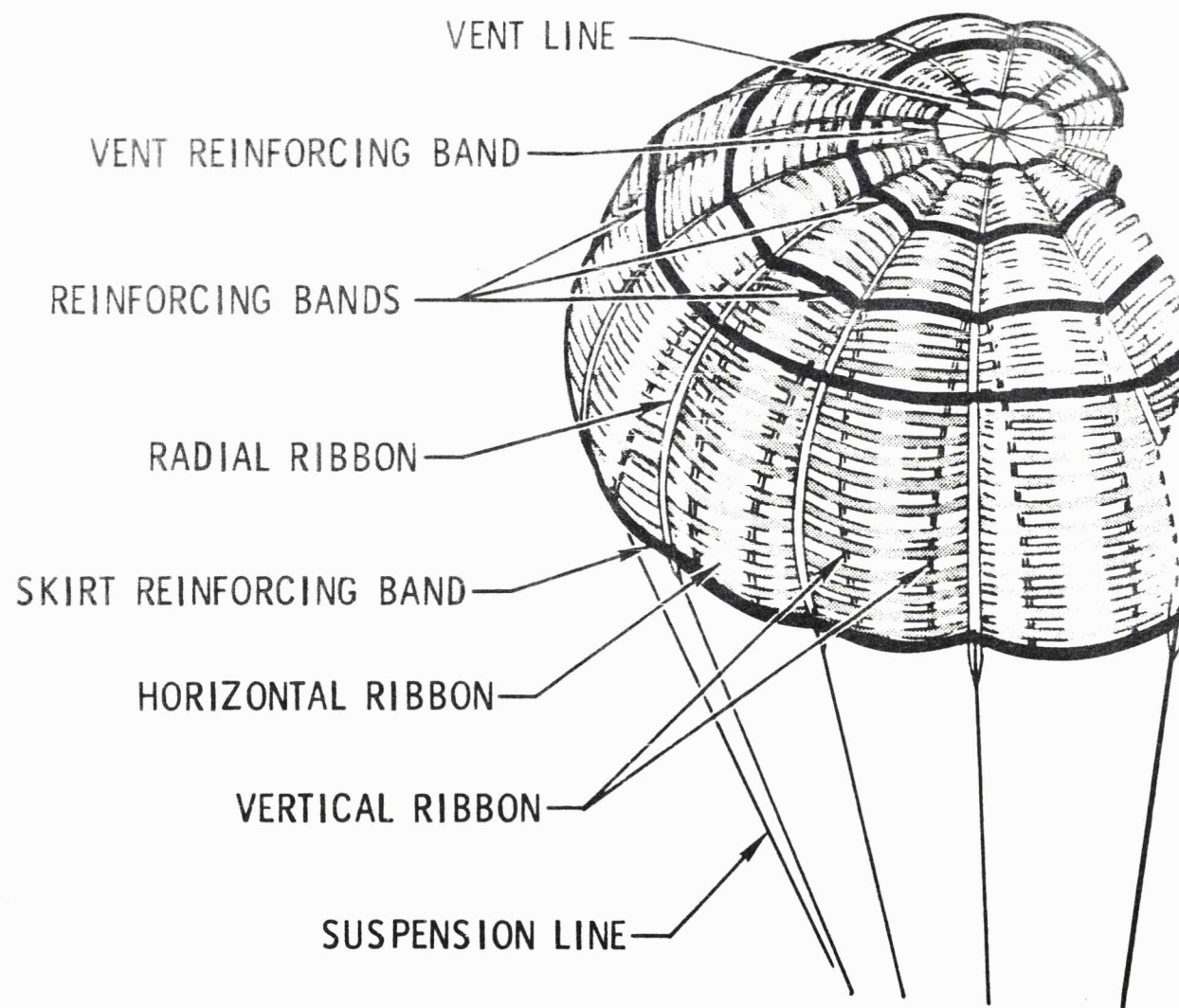


FIST RIBBON PARACHUTE  
(DROGUE)

THE DROGUE PARACHUTE IS PICTURED WITH SALIENT FEATURES INDICATED. THE DROGUES DECELERATE AND ORIENT THE CM FOR SAFE DEPLOYMENT OF THE MAIN LANDING PARACHUTES. THERE ARE TWO DROGUE CHUTES, DEPLOYED INDEPENDENTLY BY MORTARS. THEY ARE DEPLOYED AND MAINTAINED IN A REEFED CONDITION FOR EIGHT SECONDS BEFORE OPENING FULLY. SAFE RECOVERY CAN BE MADE WITH A SINGLE DROGUE.



# FIST RIBBON PARACHUTE (DROGUE)

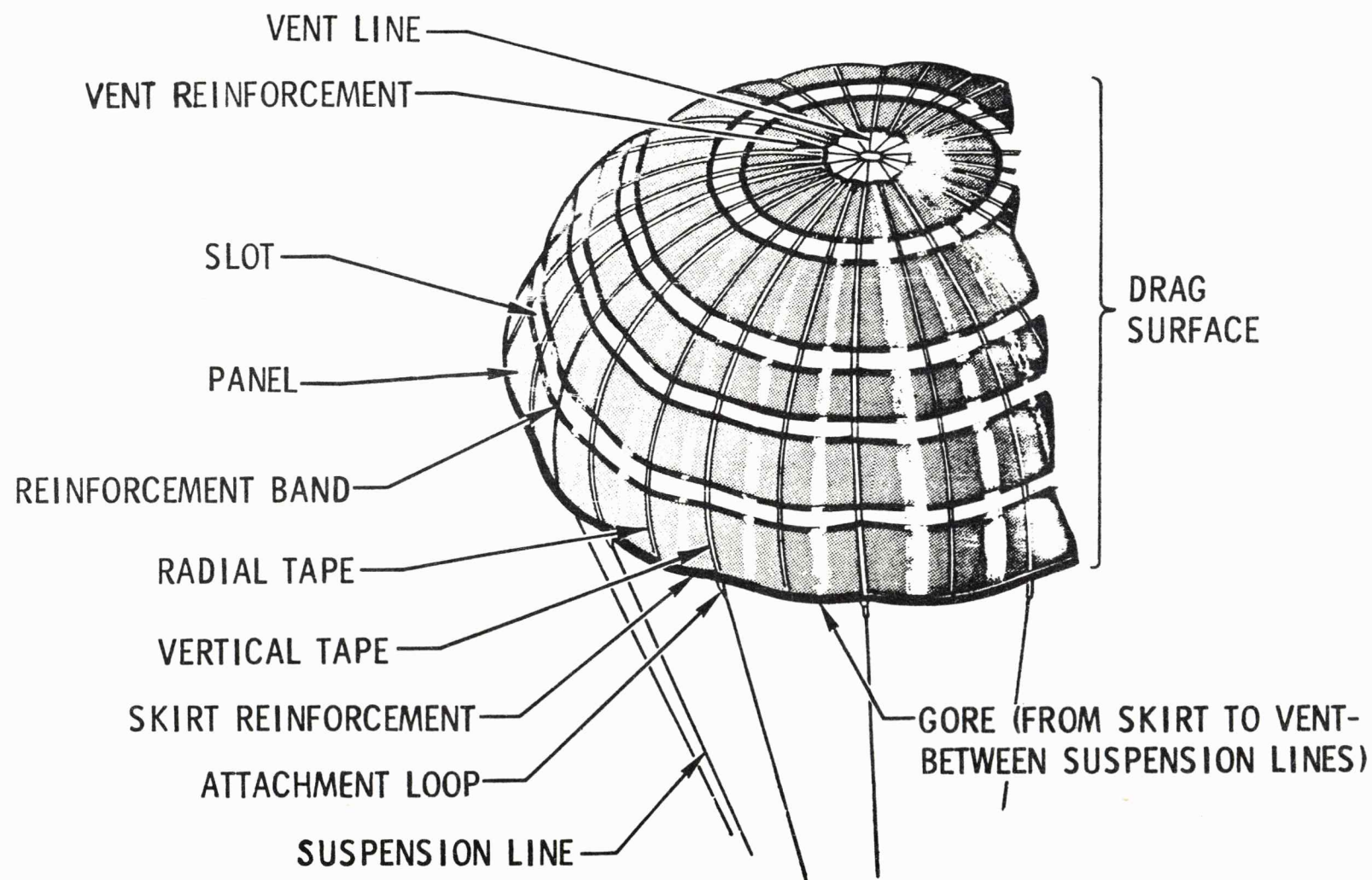


RING SLOT PARACHUTE  
(PILOT)

THE PILOT PARACHUTE IS PICTURED WITH SALIENT FEATURES INDICATED. THERE ARE THREE PILOTS, EACH DEPLOYED BY MORTARS LOCATED BESIDE THEIR RESPECTIVE MAIN LANDING PARACHUTE. THEIR FUNCTION IS TO DEPLOY THE MAIN CHUTES.

## RING SLOT PARACHUTE

(PILOT)

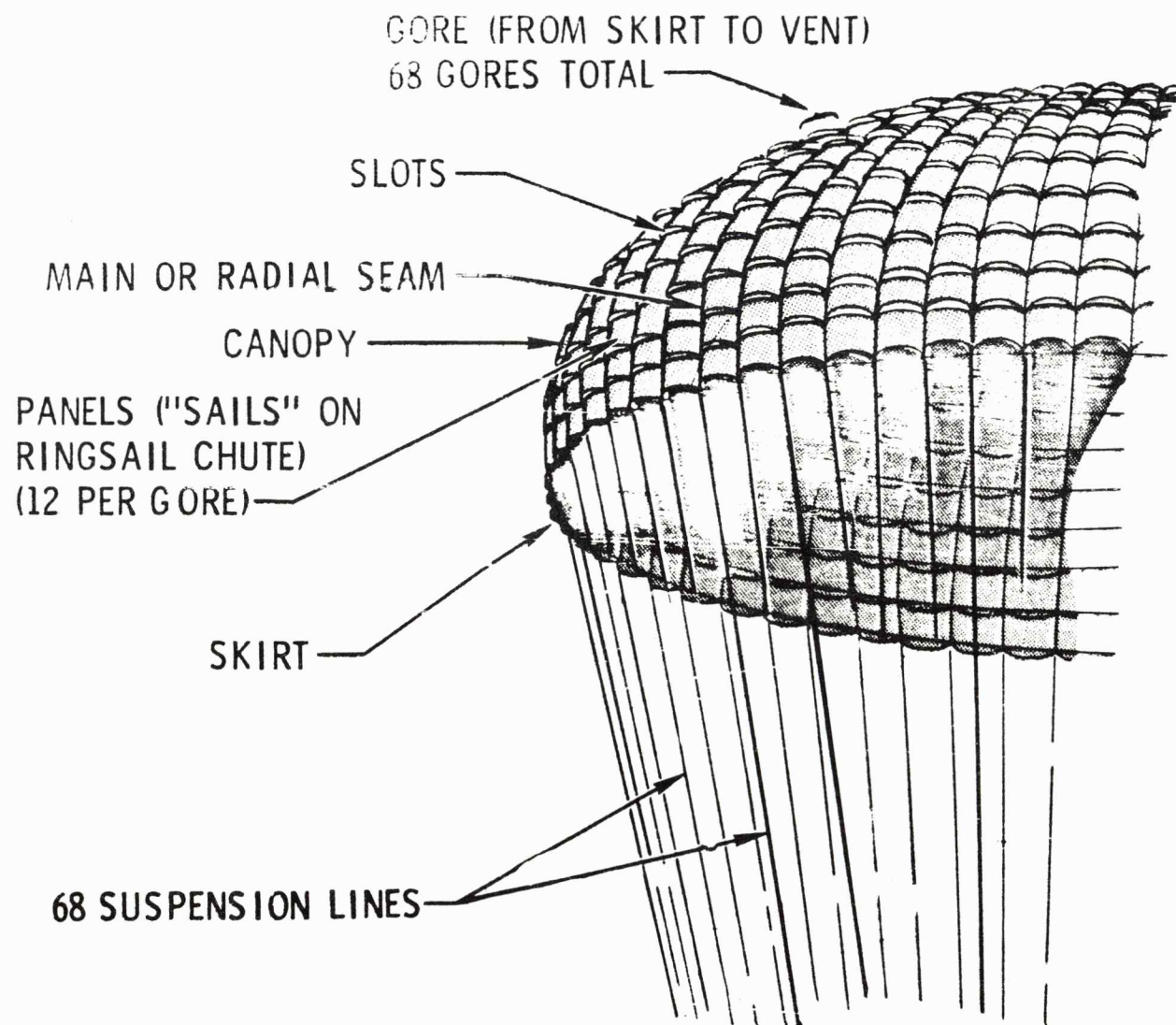


RING SAIL PARACHUTE  
(MAIN)

THE MAIN PARACHUTE IS PICTURED WITH SALIENT FEATURES INDICATED. THESE CHUTES PROVIDE EARTH LANDING WITHIN IMPACT TOLERANCES. THEY ARE DEPLOYED BY THE PILOT CHUTES IN A REEFED CONDITION AND DISREEFED AFTER EIGHT SECONDS. THERE ARE THREE OF THESE CHUTES; SUCCESSFUL RECOVERY CAN BE MADE.



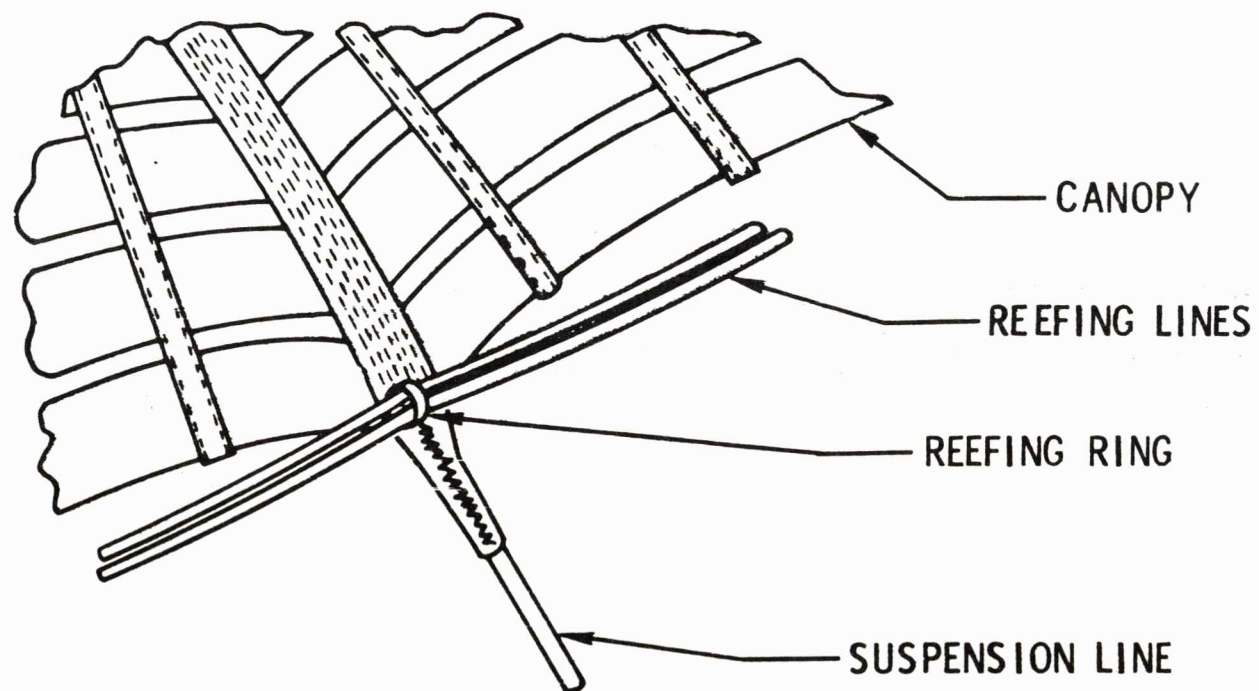
# RING SAIL PARACHUTE (MAIN)



## REEFING LINES

THE PARACHUTE REEFING LINES ARE PICTURED. EACH DROGUE CHUTE HAS TWO REEFING LINES WITH TWO REEFING LINE CUTTERS ON EACH LINE. EACH MAIN CHUTE HAS TWO REEFING LINES WITH THREE CUTTERS ON EACH LINE. CUTTERS ARE EQUALLY SPACED ABOUT THE CIRCUMFERENCE FOR ALL CHUTES.

## REEFING LINES

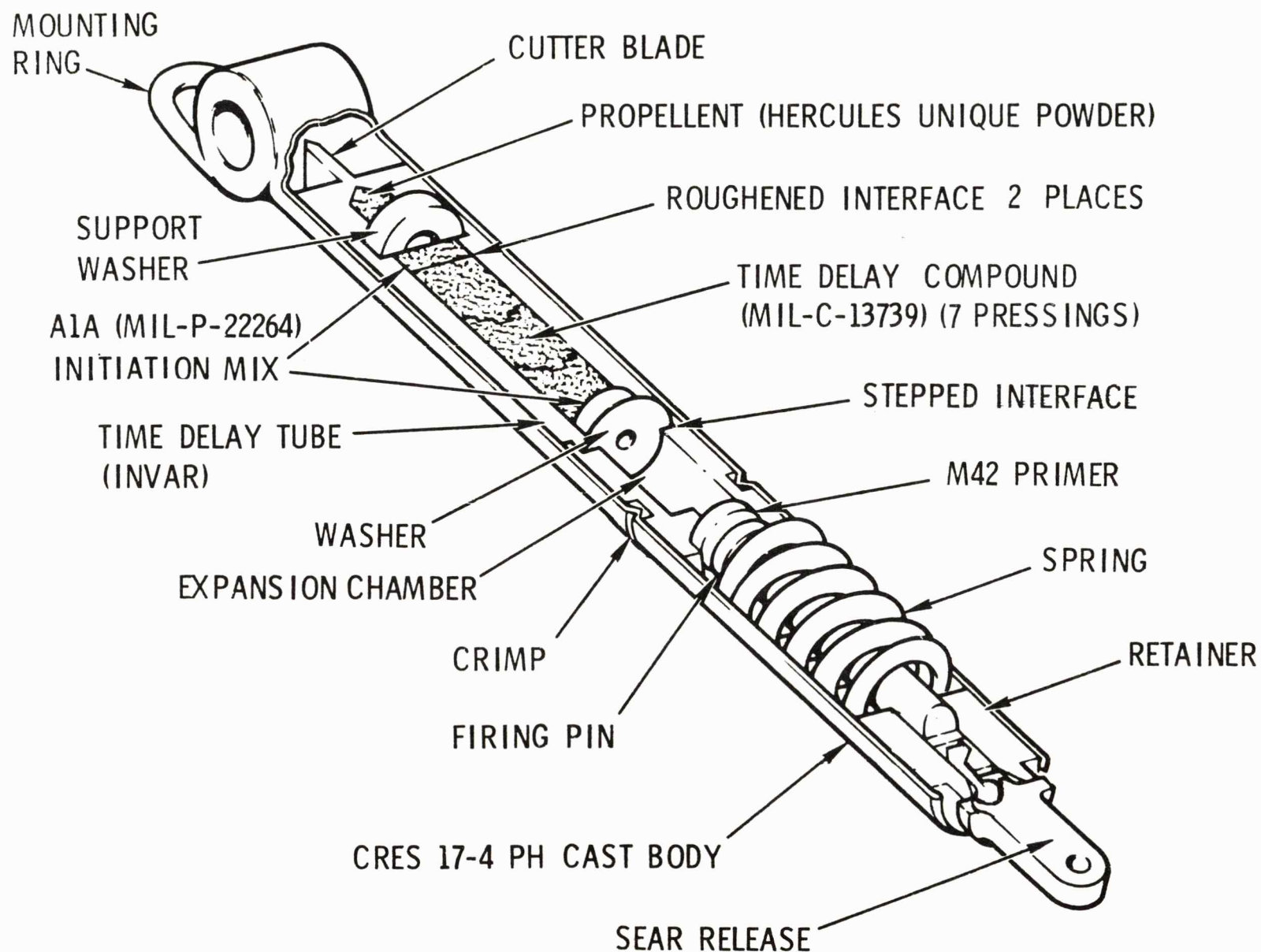


REEFING LINE CUTTER

THE PARACHUTE REEFING LINE CUTTER IS PICTURED. WHEN THE FIRING PIN IS PULLED A TIME DELAY FUSE (EIGHT SEC.) IS IGNITED WHICH IN TURN EXPLODES A SMALL CHARGE. THIS CHARGE DRIVES A CUTTING BLADE AGAINST AN ANVIL, SEVERING THE REEFING LINE.



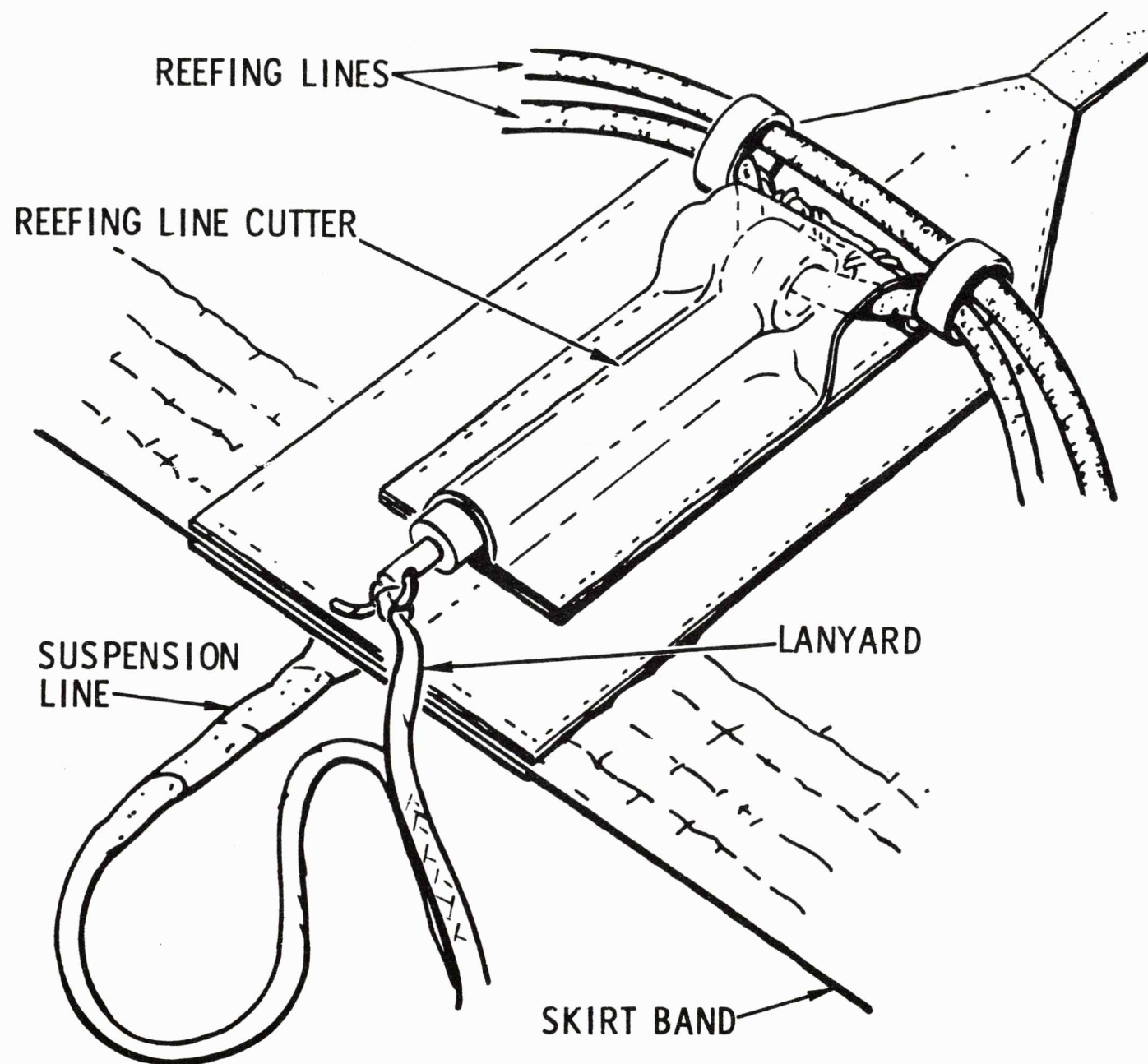
## REEFING LINE CUTTER



REEFING LINE CUTTER INSTALLATION

TYPICAL REEFING LINE CUTTER INSTALLATION IS PICTURED. WHEN THE SUSPENSION LINE/CANOPY IS FULLY SKETCHED OUT, THE LANYARD ACTUATES THE FIRING PIN.

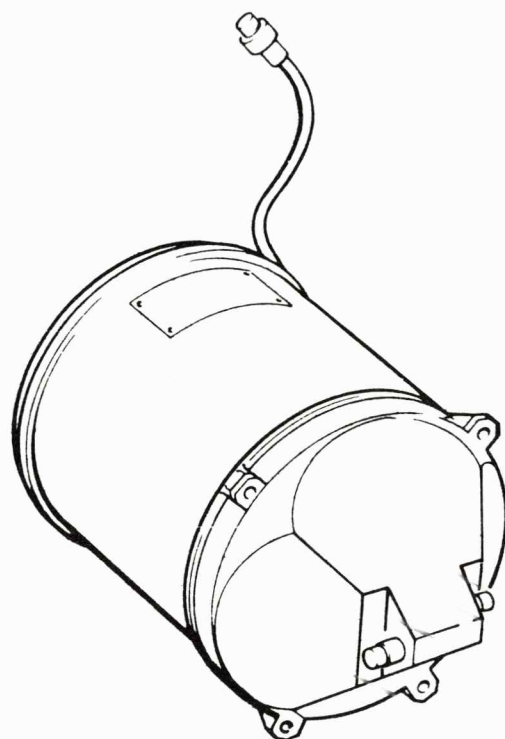
## REEFING LINE CUTTER INSTALLATION



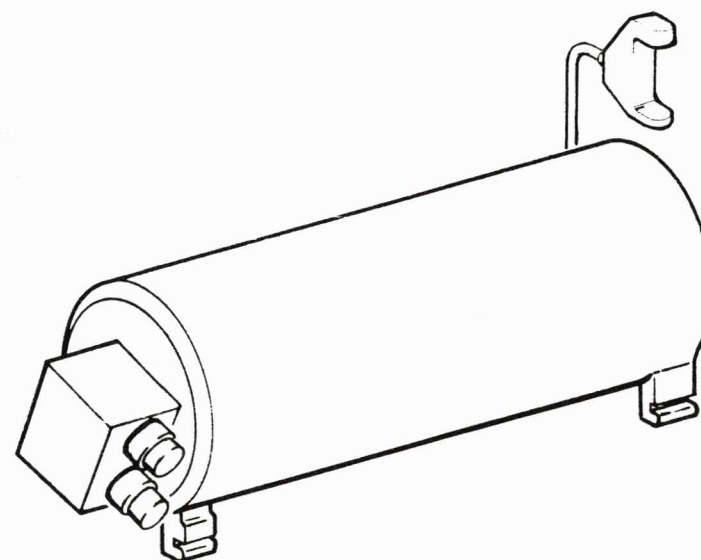
## PARACHUTE DEPLOYMENT MORTARS

THE DROGUE AND PILOT PARACHUTE MORTARS ARE PICTURED. THERE ARE TWO DROGUE AND THREE PILOT CHUTE MORTARS LOCATED ON THE CM UPPER DECK. REDUNDANT GAS PRESSURE CARTRIDGES FIRED BY REDUNDANT CIRCUITRY OF THE ELSC GENERATE GAS PRESSURE WITHIN THE MORTARS TO EXPEL THE CHUTES BY ACTUATING A SABOT.

## PARACHUTE DEPLOYMENT MORTARS



DROGUE

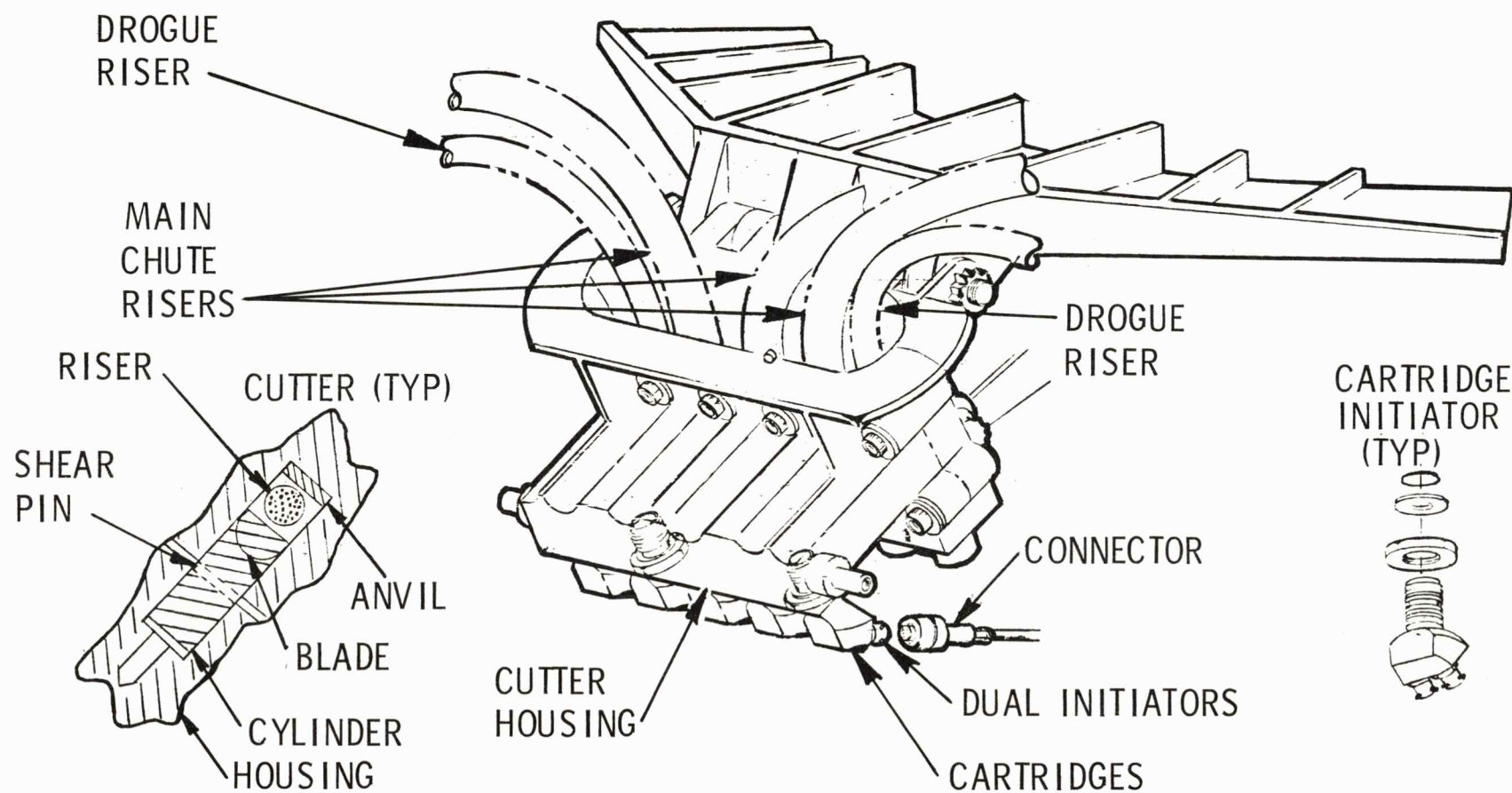


PILOT

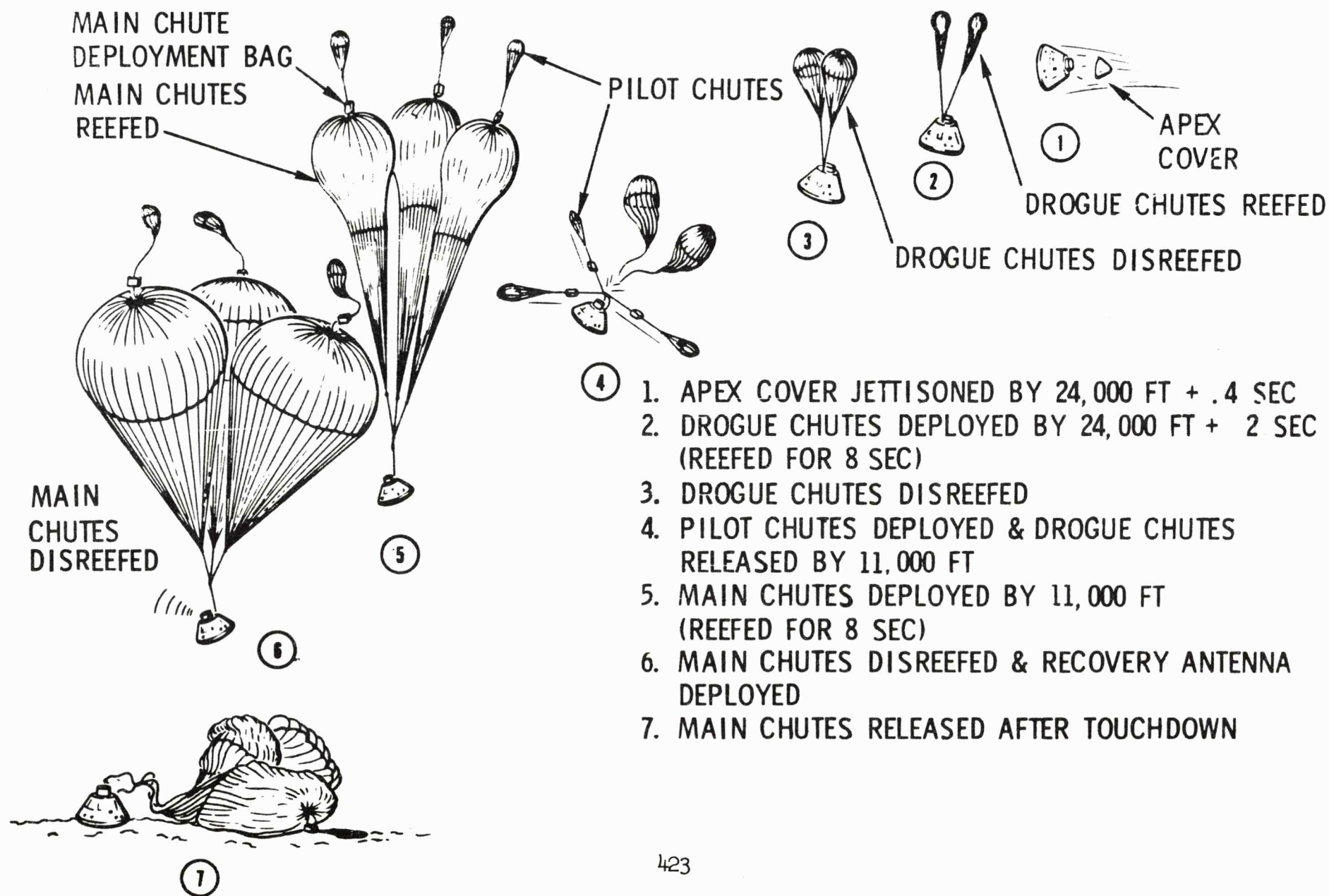
## PARACHUTE DISCONNECT

THE PARACHUTE DISCONNECT MECHANISM IS ILLUSTRATED. THE BLADE HOUSING CONTAINS FIVE CUTTING BLADES WHICH ARE ACTIVATED BY SEPARATE GAS CARTRIDGES. DUAL INITIATORS ARE PROVIDED FOR EACH CARTRIDGE. THE TWO DROGUE RISERS AND THE THREE MAIN RISERS ARE CUT SIMULTANEOUSLY ON RECEIPT OF THEIR RESPECTIVE SIGNAL.



PARACHUTE DISCONNECT  
BLOCK II

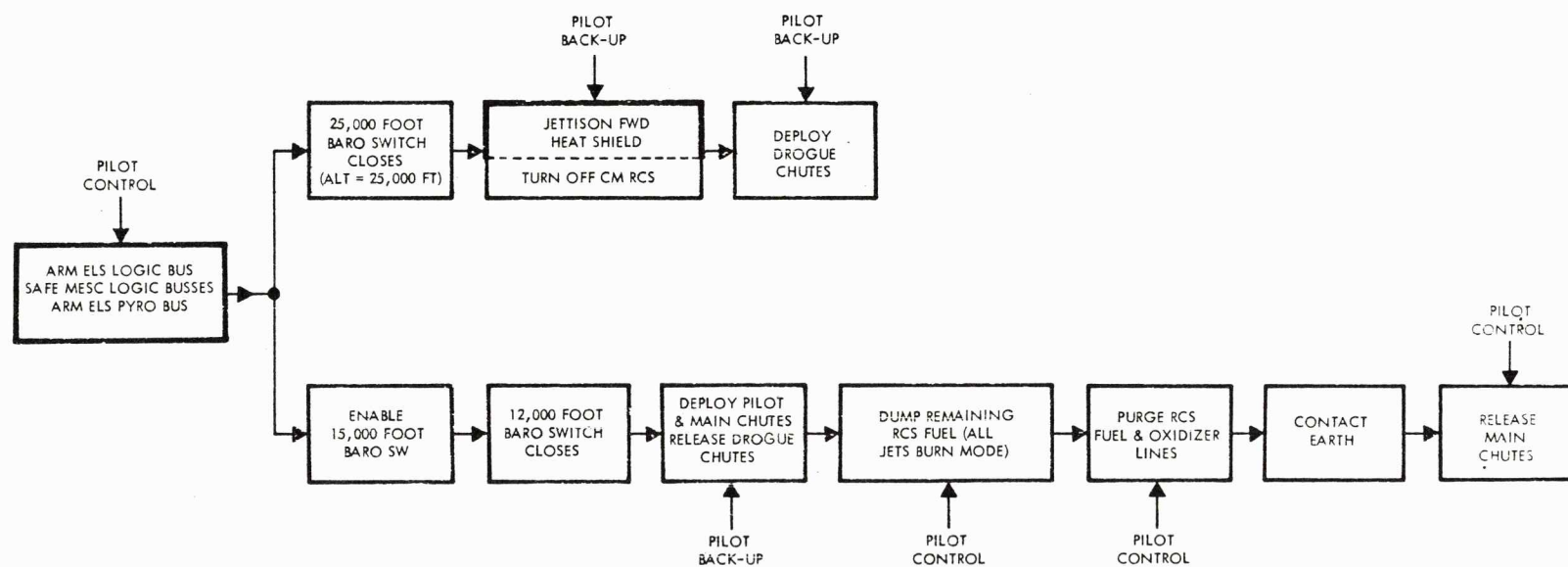
# EARTH LANDING SYSTEM NORMAL SEQUENCE



APOLLO ENTRY EVENTS SEQUENCE  
(EARTH LANDING SEGMENT)

SEQUENTIAL EVENTS OF THE EARTH LANDING SEGMENT OF FLIGHT ARE PICTURED IN BLOCK DEAGRAM  
LOGIC. THESE EVENTS ARE CONTROLLED BY THE EARTH LANDING SYSTEM SEQUENCE CONTROLLER.

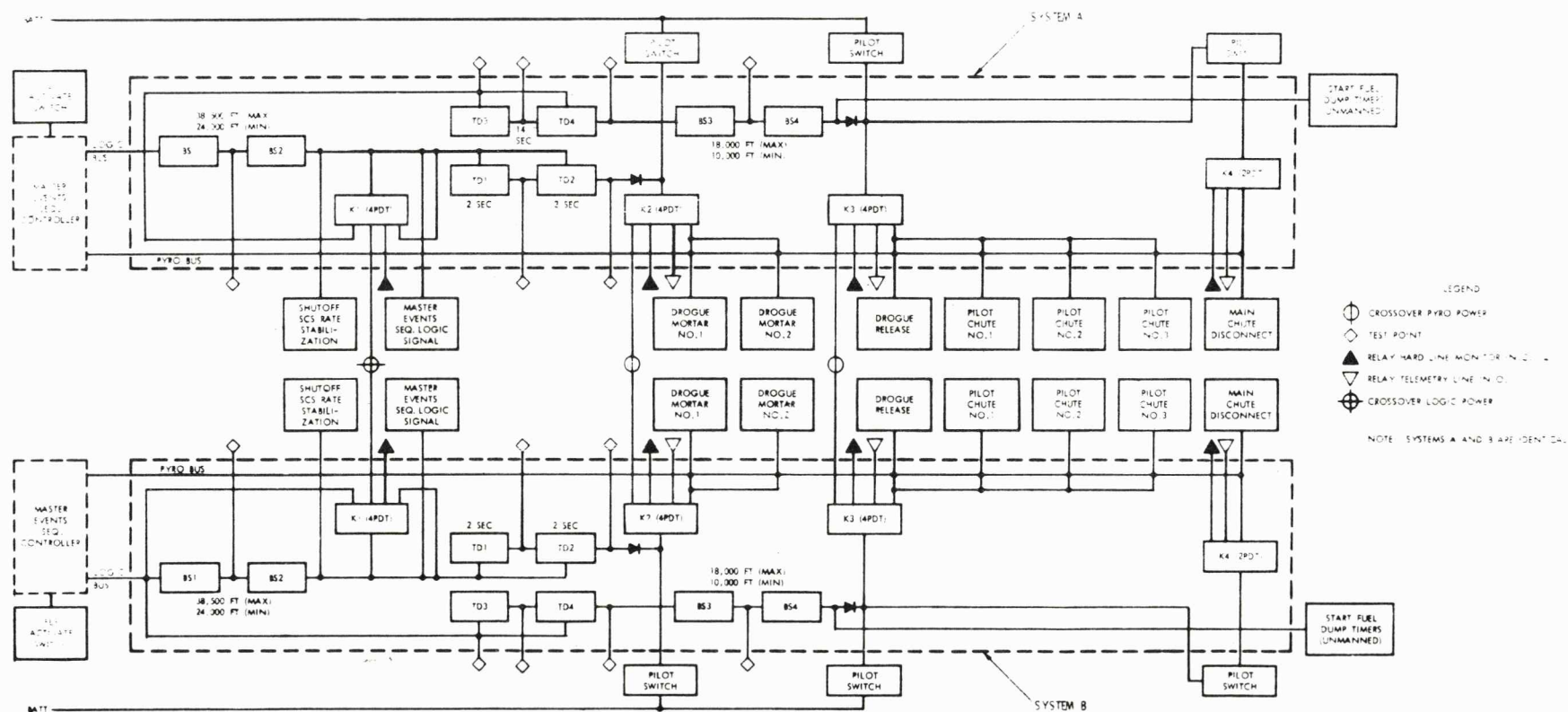
# APOLLO ENTRY EVENTS SEQUENCE



EARTH LANDING SEQUENCE CONTROLLER FUNCTIONAL BLOCK DIAGRAM

A FUNCTIONAL BLOCK DIAGRAM OF THE ELSC IS GIVEN FOR THE NORMAL RECOVERY SEQUENCE.  
REDUNDANT SYSTEMS A AND B ARE ILLUSTRATED.

## EARTH LANDING SEQUENCE CONTROLLER FUNCTIONAL BLOCK DIAGRAM

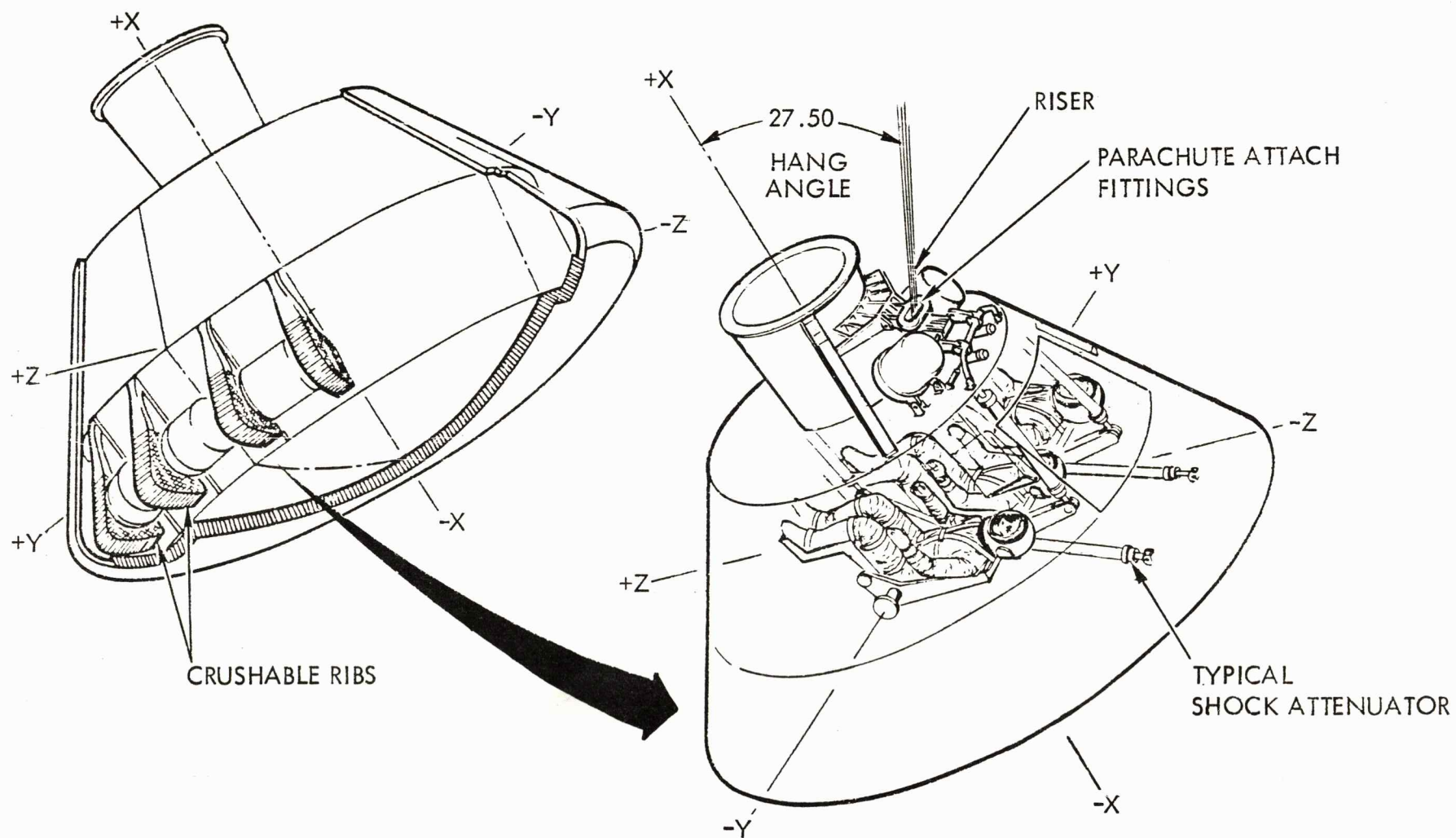




## EARTH IMPACT SUBSYSTEM

THIS CHART ILLUSTRATES THE MAIN FEATURES WHICH HAVE BEEN INCORPORATED INTO THE CM IN ORDER TO PROVIDE ACCEPTABLE IMPACT CONDITIONS. THESE INCLUDE ATTENUATION STRUTS, CRUSHABLE RIBS, STRENGTH IN HEATSHIELD AND BASIC CM STRUCTURE AND IMPACT ATTITUDE OPTIMIZATION (HANG ANGLE).

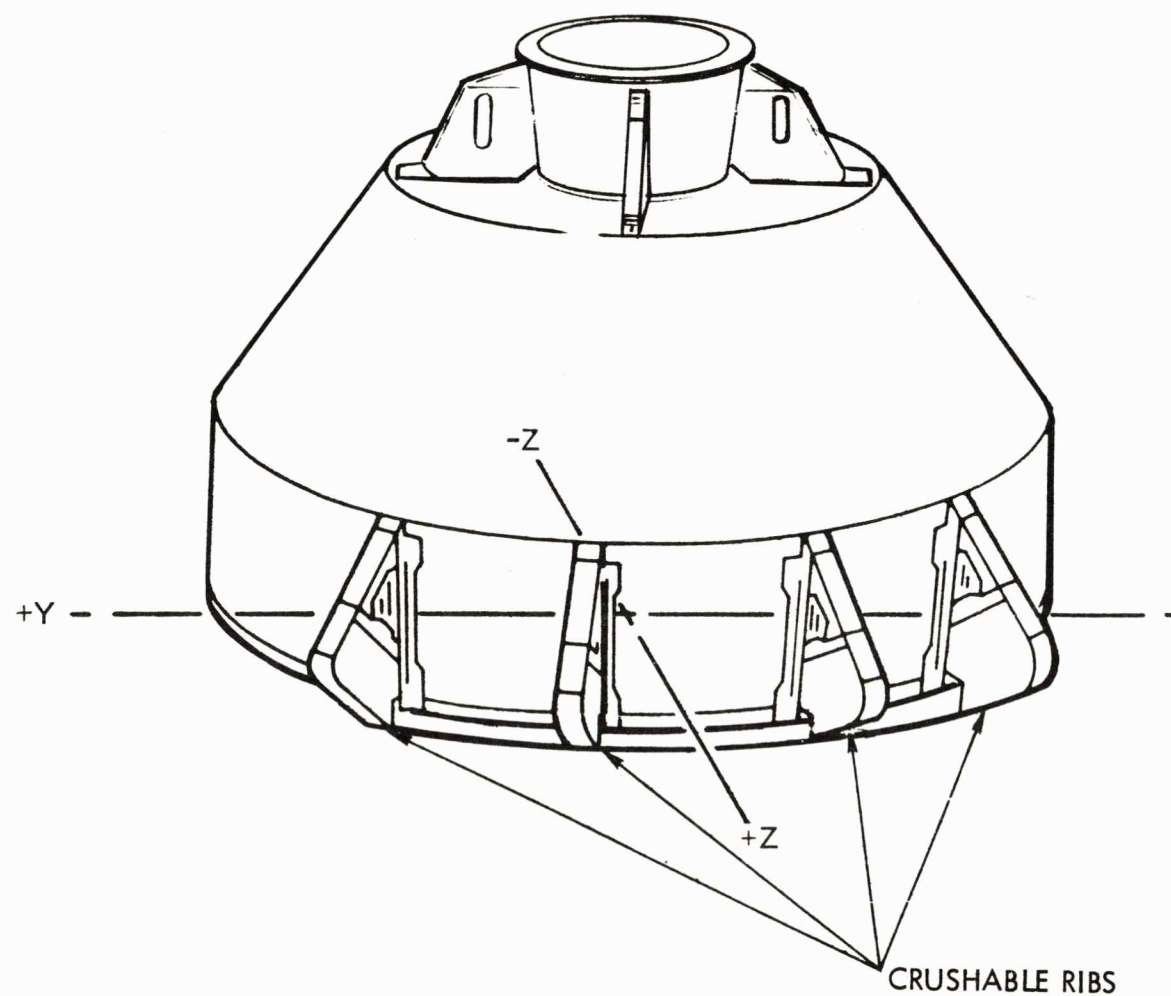
## EARTH IMPACT SYSTEM



## CRUSHABLE RIBS

THERE ARE FOUR CRUSHABLE HONEYCOMB CORE RIBS LOCATED ON THE +Z SIDE OF THE CM FOR PURPOSES OF IMPACT ATTENUATION. THIS FIGURE OF THE CM INNER SHELL AND RIBS ILLUSTRATES THE SIZE AND LOCATION OF THE RIBS.

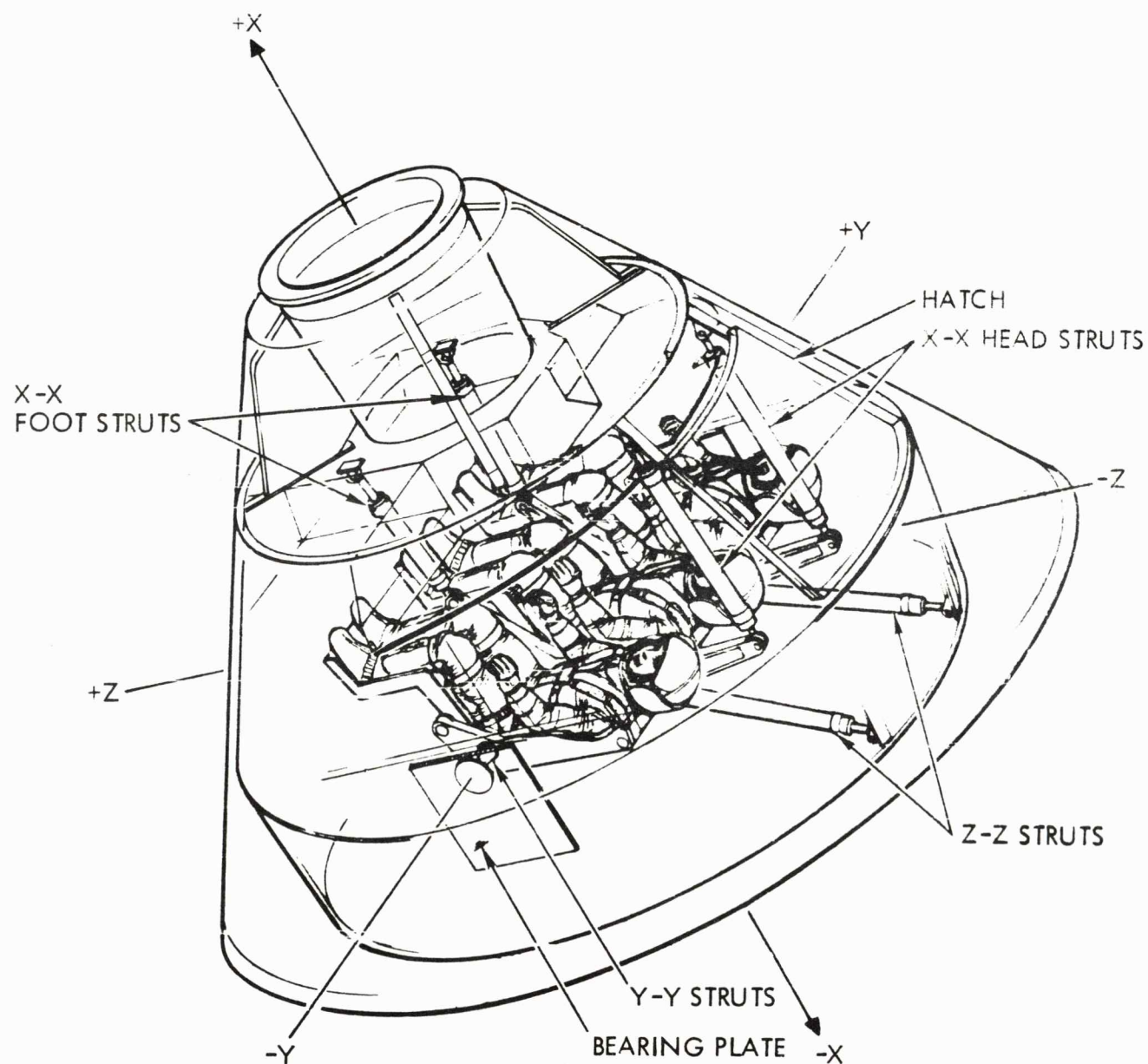
## CRUSHABLE RIB CONFIGURATION



## APOLLO COMMAND MODULE ATTENUATION SYSTEM AND CREW

THE ARRANGEMENT OF THE UNITIZED CREW COUCHES AND SHOCK ATTENUATION SHUTES ARE PICTURED. THESE ARE A TOTAL OF EIGHT SHUTES: FOUR X-X, TWO Y-Y AND TWO Z-Z. SUBSEQUENT CHARTS DEPICT THE INTERNAL DESIGN OF THE SHUTS.

## APOLLO COMMAND MODULE ATTENUATION SYSTEM AND CREW

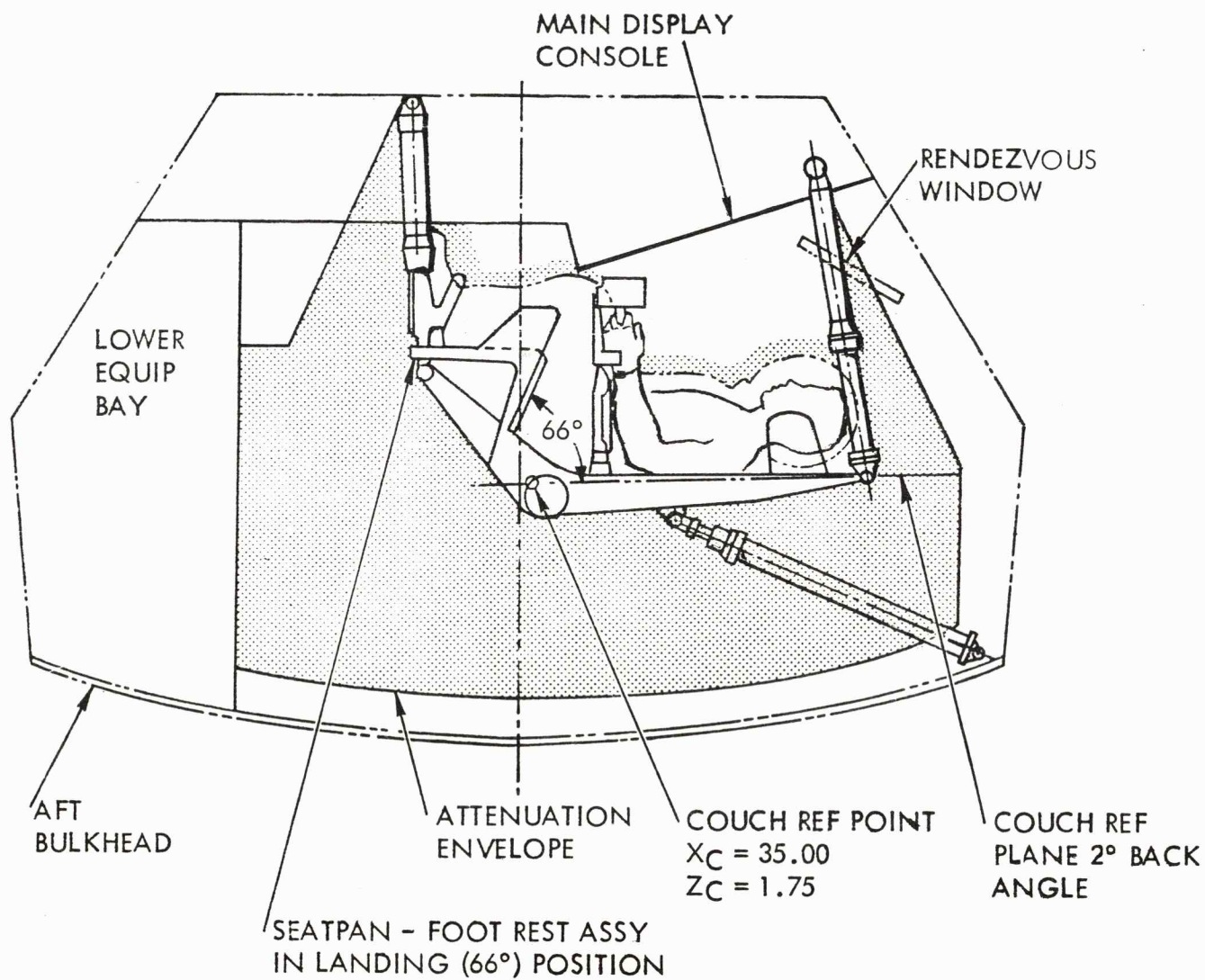




CREW SUPPORT SYSTEM ENVELOPE OF TRAVEL

THE MAXIMUM ENVELOPE PROVIDED FOR ASTRONAUT/COUCH TRAVEL IS GRAPHICALLY DEPICTED.

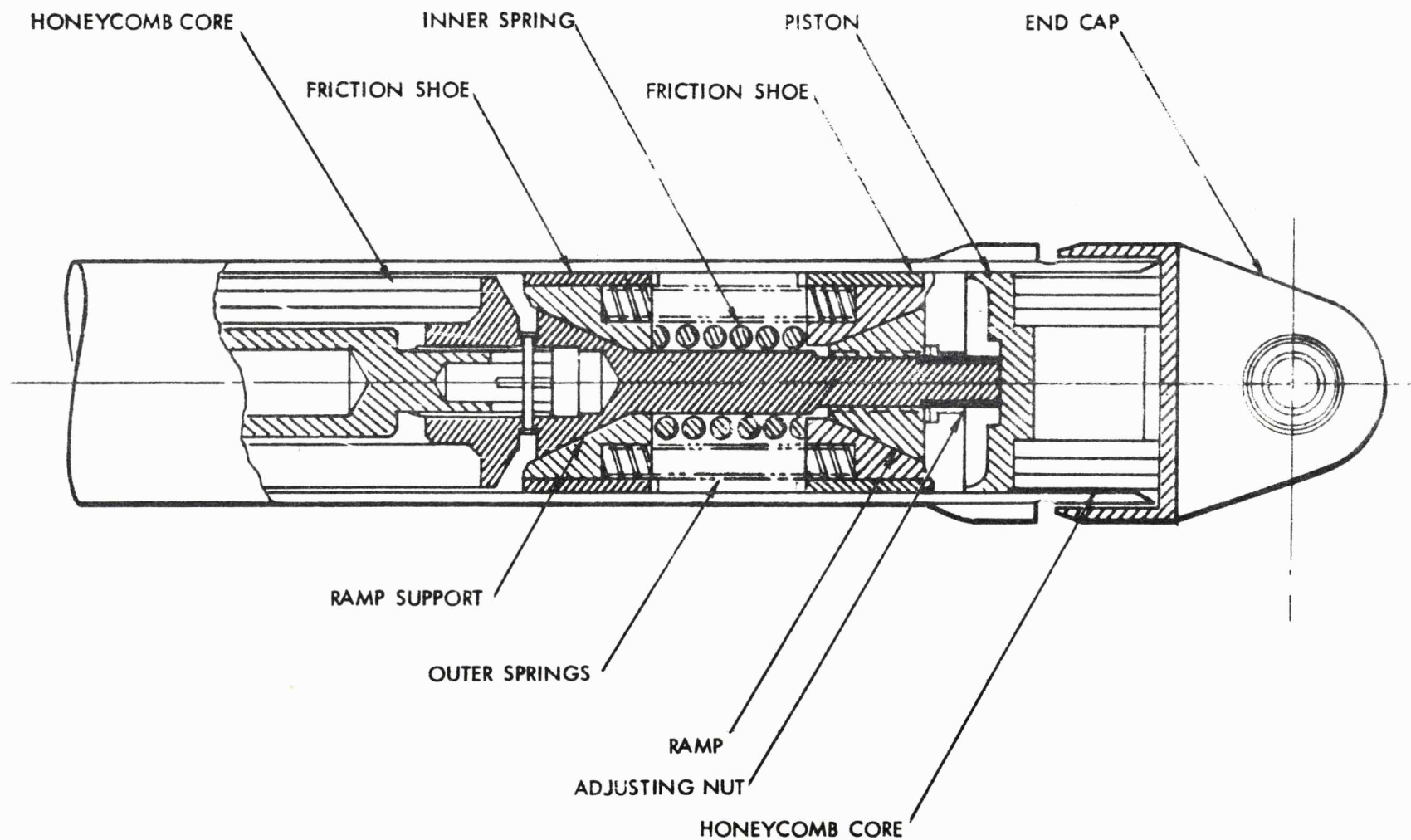
## CREW SUPPORT SYSTEM ENVELOPE OF TRAVEL



## ATTENUATING STRUT FRICTION MECHANISM

CROSS SECTION OF A TYPICAL X-X ATTENUATING STRUT IS PRESENTED. SHOWN IS THE HONEYCOMB CORE AND FRICTION DEVICE, EACH OF WHICH ABSORB ENERGY UPON IMPACT. ADDITIONALLY, THE FRICTION DEVICE PRESENTS FREE PLAY DURING RETURN STROKE. DEVICES SIMILAR TO THE ONE SHOWN ARE ALSO IN THE Z-Z STRUTS. THE Y-Y STRUTS CONTAIN A HONEYCOMB CORE ONLY.

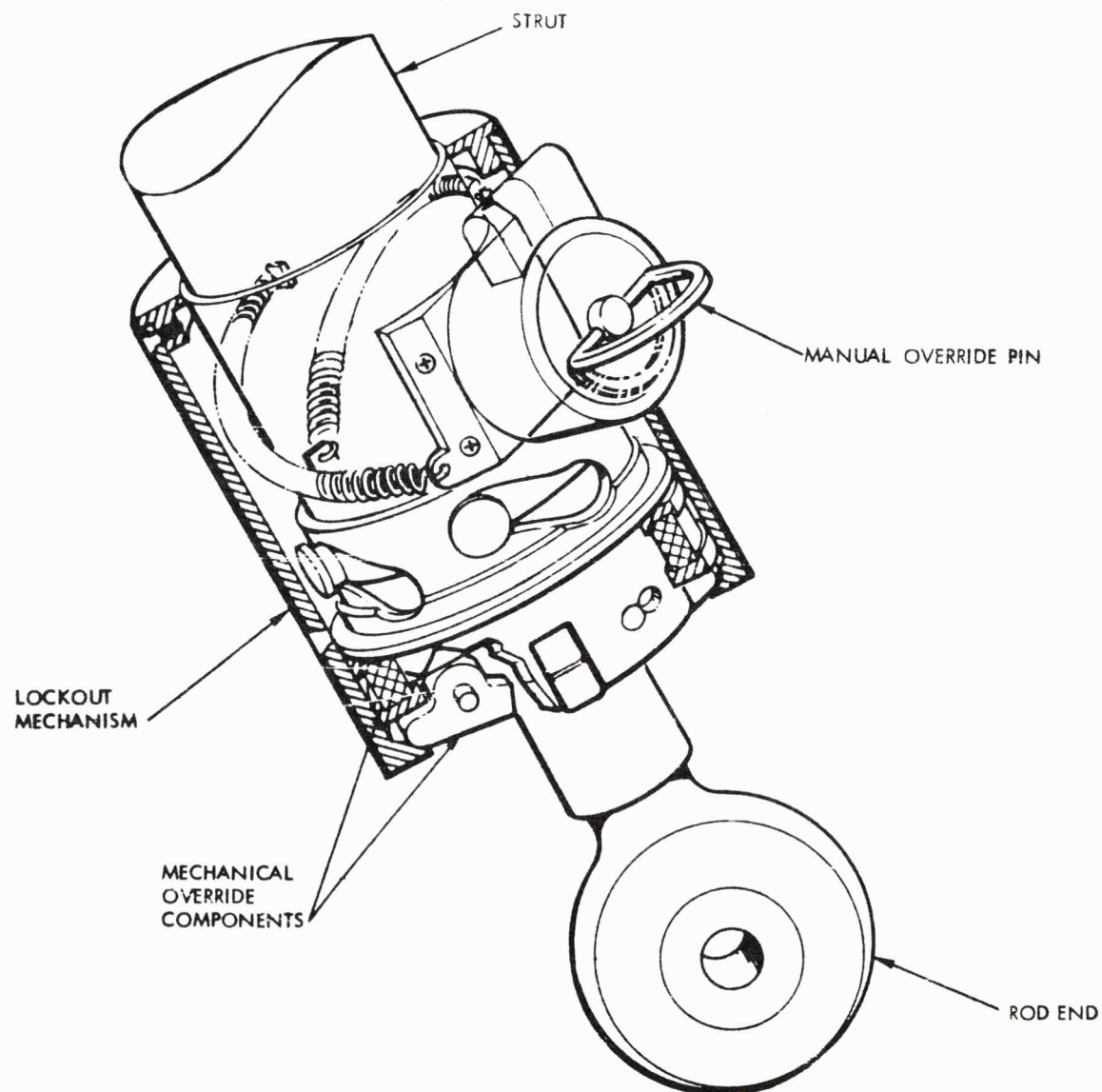
## ATTENUATING STRUT FRICTION MECHANISM



## ATTENUATING STRUT LOCKOUT MECHANISM

LOCKOUT MECHANISMS ARE MOUNTED ON THE FOUR X-X STRUTS TO PREVENT STROKING FROM FLIGHT LOADS. THE DEVICES ARE NORMALLY UNLOCKED ELECTRICALLY, BUT ARE DESIGNED WITH MANUAL OVERRIDE AND AUTOMATIC BREAKOUT CAPABILITY.

## ATTENUATING STRUT LOCKOUT MECHANISM

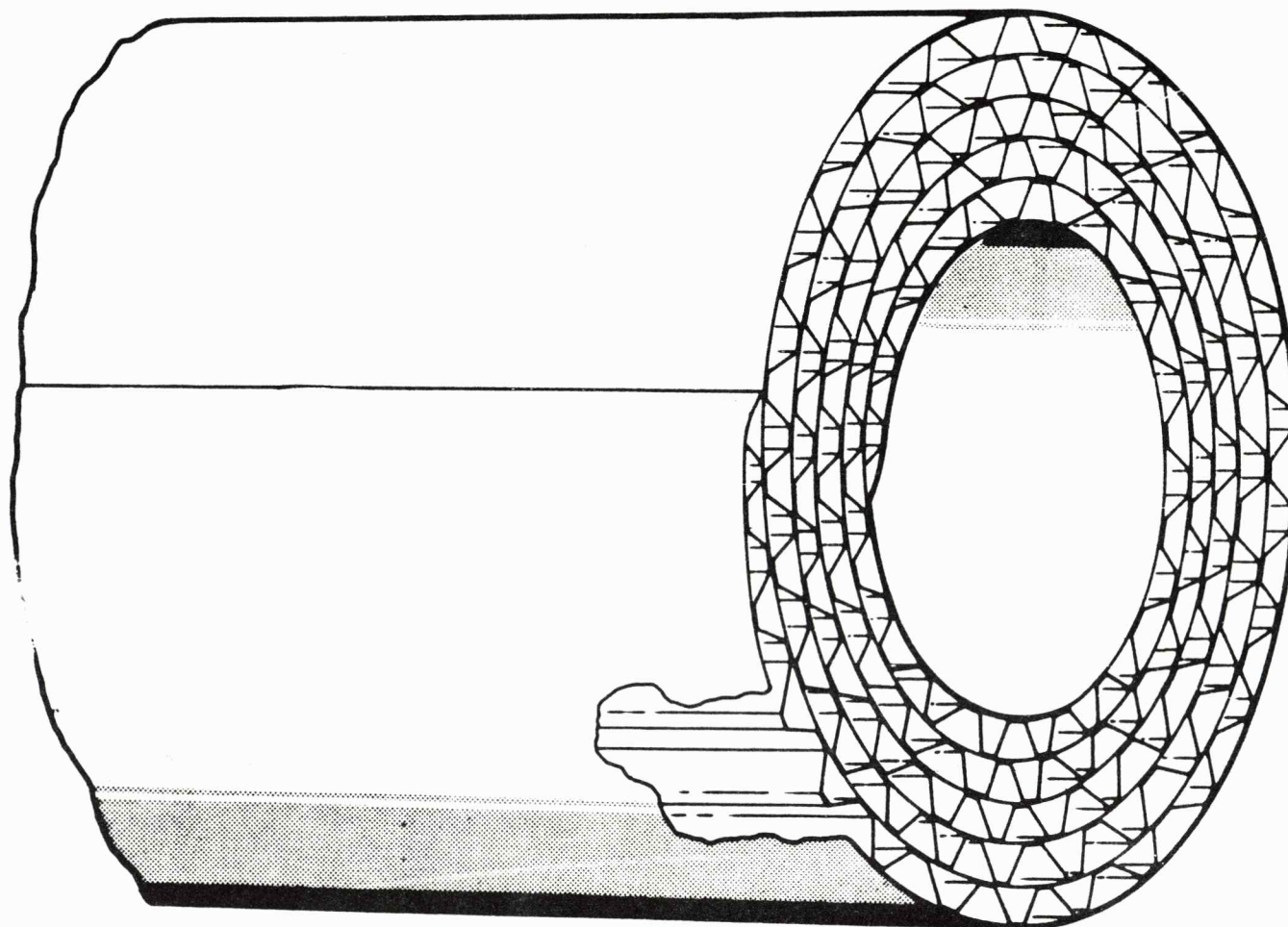


ATTENUATING STRUT WRAPPED SPIRAL HONEYCOMB CORE

THE HONEYCOMB CORE THAT IS MOUNTED WITHIN EACH ATTENUATING STRUT IS PICTURED.



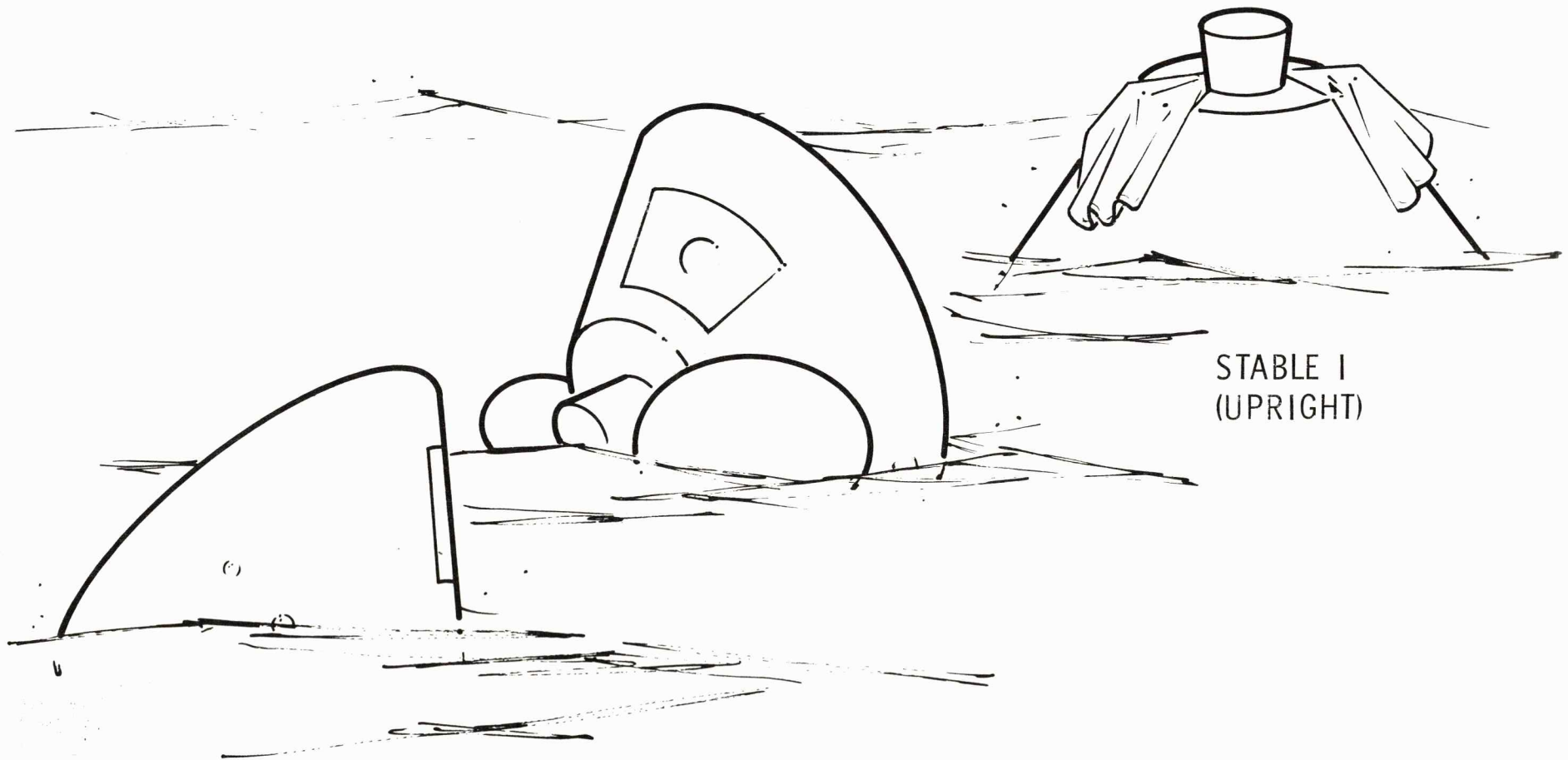
## ATTENUATING STRUT WRAPPED SPIRAL HONEYCOMB CORE



## UPRIGHTING

THIS BASIC FUNCTION OF THE UPRIGHTING BAGS IS DESCRIBED - PROPER SEQUENTIAL INFLATION OF ANY TWO OF THE THREE BAGS PROVIDED WILL UPRIGHT THE CM TO A STABLE I ATTITUDE. THE BAGS ARE INFLATED BY TWO COMPRESSORS (FOR REDUNDANCY) OPERATING SIMULTANEOUSLY. THE COMPRESSORS, WHICH ARE LOCATED IN THE LOWER EQUIPMENT BAY, ARE ACTIVATED BY SWITCHING TO THE FILL MODE FOR ANY ONE OF THE THREE BAGS. A SEPARATE SWITCH IS PROVIDED FOR EACH BAG.

# UPRIGHTING



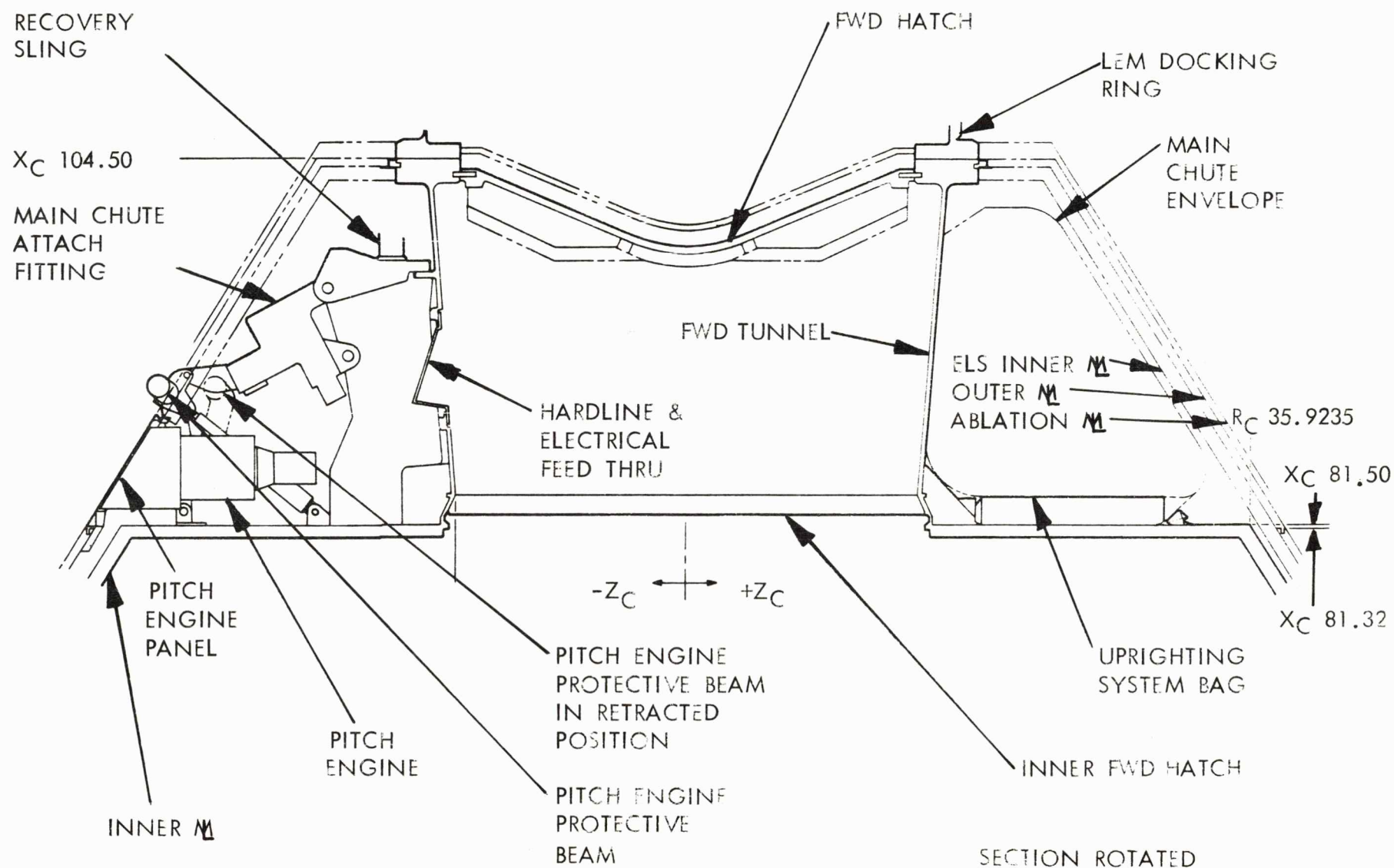
STABLE I  
(UPRIGHT)

STABLE II  
(INVERTED)

ELS AND FLOTATION STOWAGE

THIS CHART SHOWS THE TYPICAL STOWAGE ARRANGEMENT OF THE MAIN PARACHUTE AND UPRIGHTING  
SYSTEM BAGS.

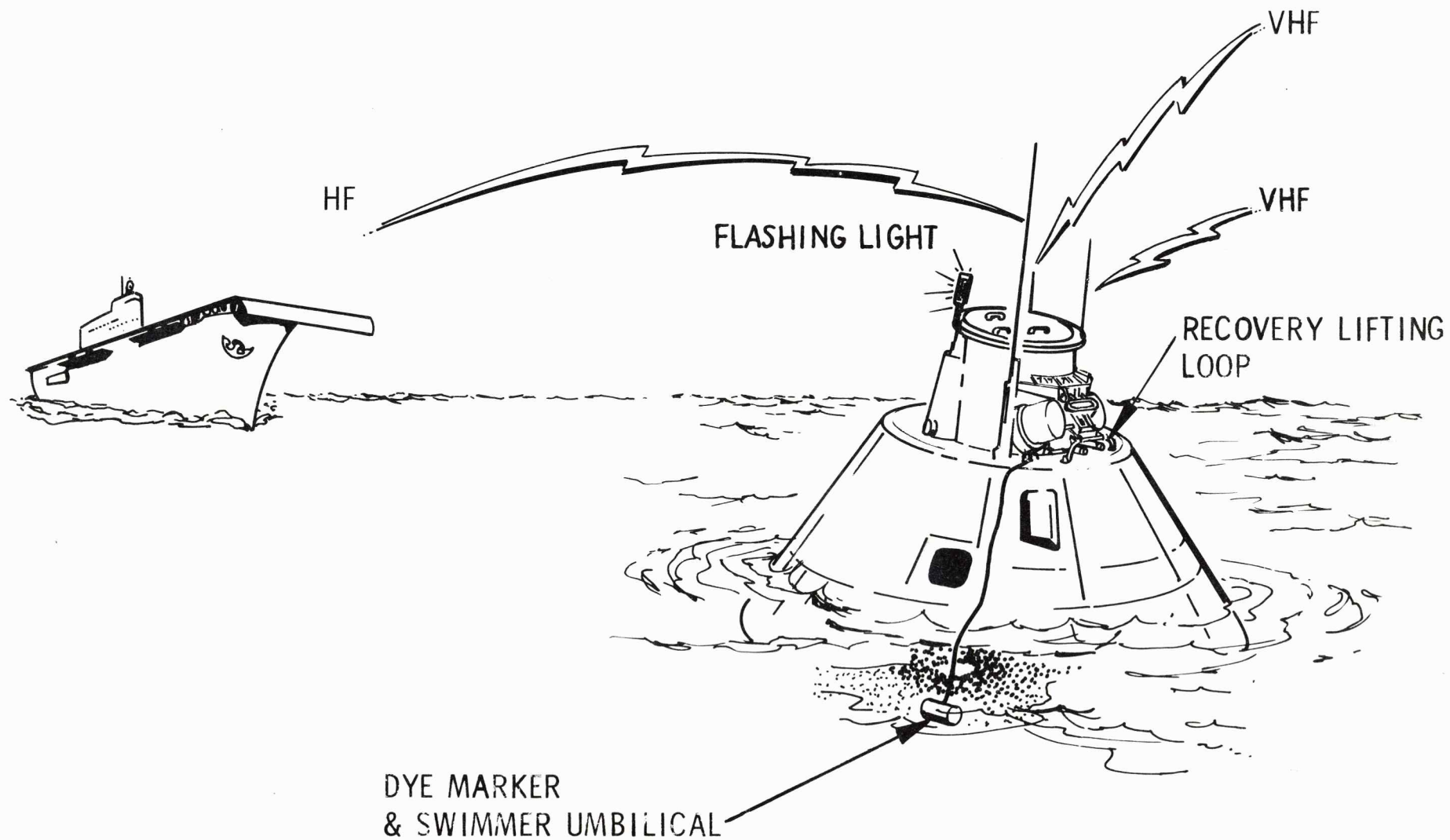
## ELS &amp; FLOTATION STOWAGE



## POST LANDING AND RETRIEVAL

LOCATION AND RETRIEVAL OF THE ASTRONAUTS AND CM WILL BE AIDED BY ONE VHF AND TWO HF ANTENNAS, A HIGH INTENSITY FLASHING LIGHT, SEA DYE MARKER AND SWIMMER UMBILICAL AND RECOVERY LIFTING LOOP. THESE ITEMS ARE ILLUSTRATED BY THIS CHART.

## POST LANDING &amp; RETRIEVAL

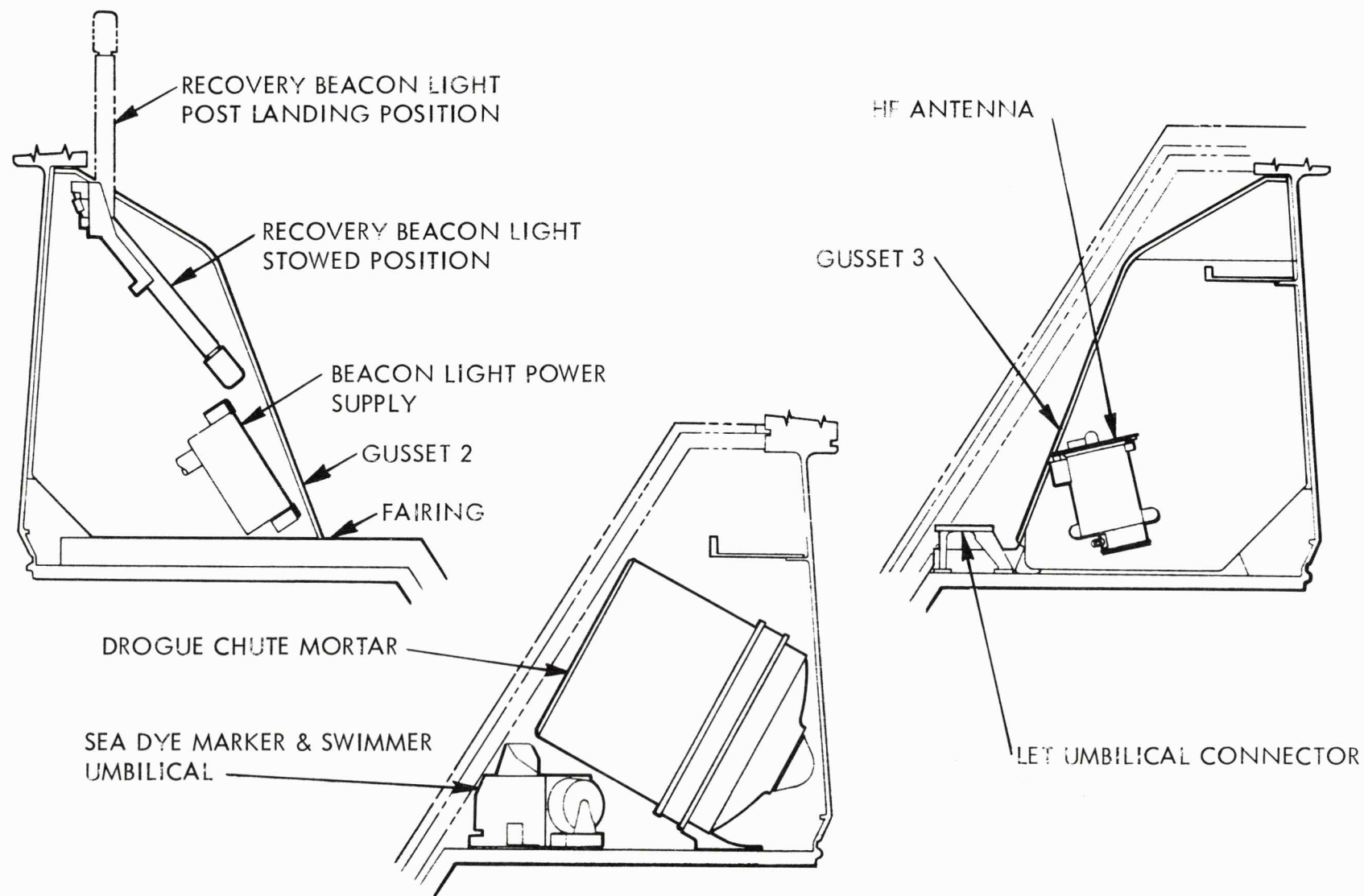




## RECOVERY AIDS

THIS CHART IS A PICTORIAL ELEVATION SHOWING BASIC LOCATION AND INSTALLATION FEATURES OF THE RECOVERY BEACON LIGHT, SEA DYE MARKER AND HF ANTENNA. THE STOWED AND POST-LANDING POSITION IS SHOWN FOR THE BEACON LIGHT. THE OTHER EQUIPMENT IS SHOWN IN THE PRE-DEPLOY CONFIGURATION.

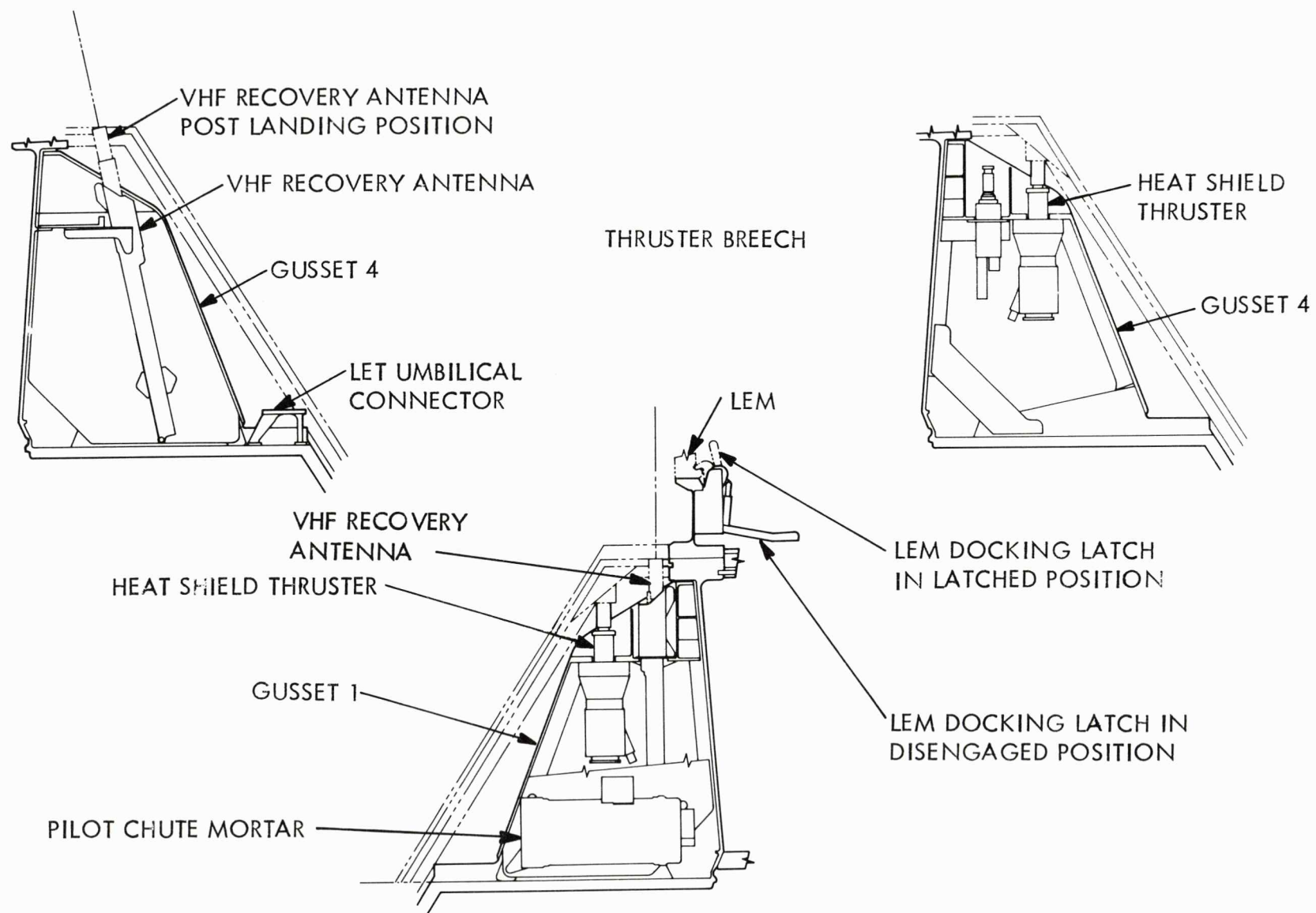
## RECOVERY AIDS



RECOVERY AIDS AND THRUSTORS

THIS CHART IS A PICTORIAL ELEVATION SHOWING THE RELATIVE LOCATION AND INSTALLATION ARRANGEMENT OF CERTAIN RECOVERY AIDS, THRUSTORS AND OTHER EQUIPMENT IN THE UPPER DECK AREA.

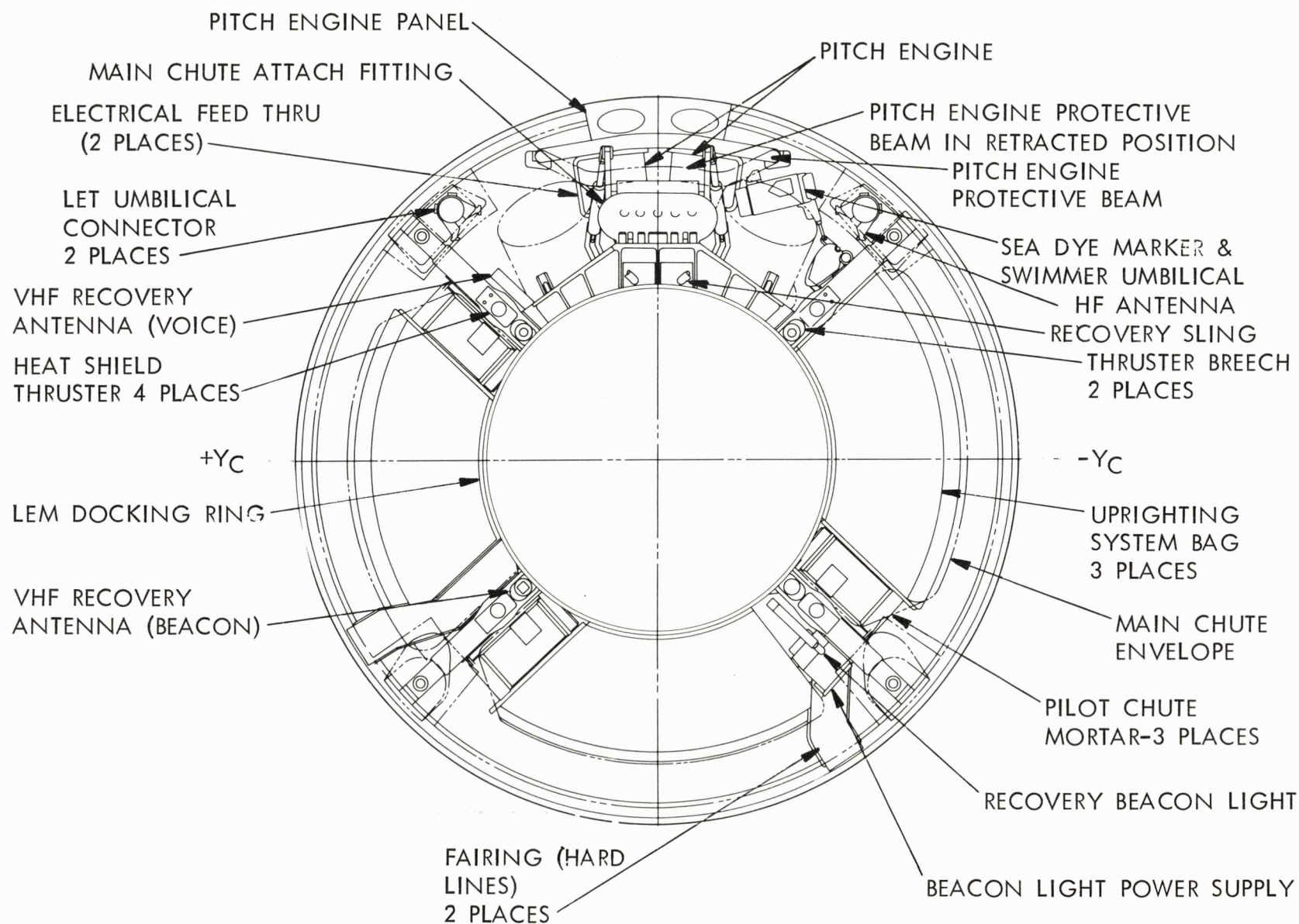
## RECOVERY AIDS &amp; THRUSTERS



ERS EQUIPMENT ARRANGEMENT

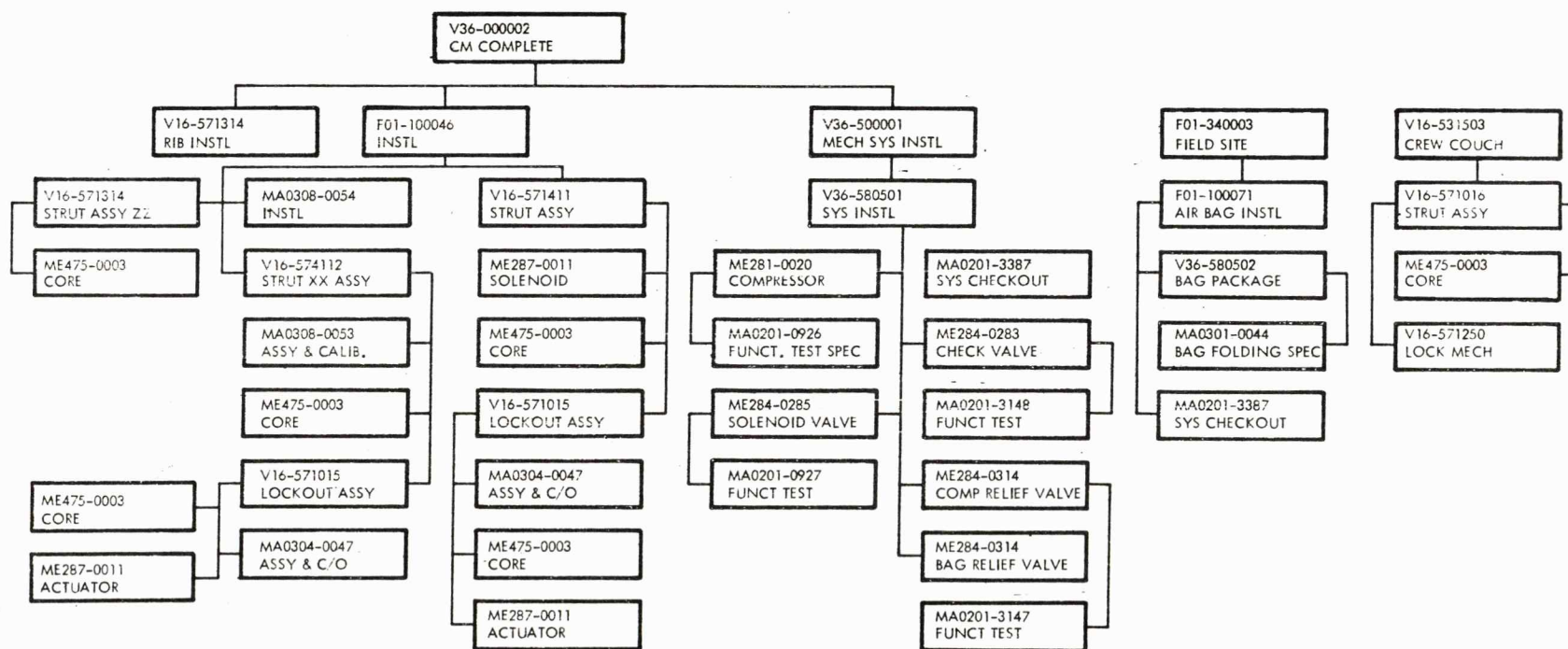
THIS VIEW OF THE UPPER DECK SHOWS THE ERS COMPONENTS AND OTHER EQUIPMENT LOCATED IN  
THIS AREA OF THE CM.

## ERS EQUIPMENT ARRANGEMENT





## CM FLOTATION &amp; IMPACT DRAWING &amp; SPECIFICATION TREE - SUMMARY





## EARTH LANDING SYSTEM SPECIFICATIONS

ME 901-0579      PARACHUTE PROCUREMENT

MC 901-0579A    PARACHUTE PROCUREMENT

MA 0202-0029    INSTALLATION

MA 0201-3157    DROP TESTS

## IMPACT SYSTEM SPECIFICATIONS

MA 0308-0053	ASSY & CALIBRATION SPEC - STRUTS
MA 0304-0047	STRUT LOCKOUT ASSY & CHECKOUT
MA 0308-0054	STRUT INSTALLATION SPEC
ME 287-0011	STRUT LOCKOUT ACTUATOR
MC 287-0011	STRUT LOCKOUT ACTR PROC. SPEC.
ME 901-0381	RIBS
MC 901--381	RIBS PROCUREMENT SPEC
ME 475-0003	STRUT CRUSHABLE CORES
MC 475-0003	STRUT CORE PROC. SPEC

## UPRIGHTING SYSTEM SPECIFICATIONS

MA0301-0044	BAG FOLDING
MA0201-3387	SYSTEM CHECKOUT
MA0201-0926	FUNCTIONAL TEST - COMPRESSOR
MA0201-0927	FUNCTIONAL TEST - SOLENOID VALVE
MA0201-3147	FUNCTIONAL TEST - RELIEF VALVE
MA0201-3148	FUNCTIONAL TEST - CHECK VALVE

## PROCUREMENT SPECIFICATIONS

ME281-0020	} COMPRESSOR
MC281-0020	

ME284-0283	} CHECK VALVE
MC284-0283	

ME284-0314	} RELIEF VALVE
MC284-0314	

ME284-0285	} SOLENOID VALVE
MC284-0285	

ME	} AIR BAG (NOT ASSIGNED TO DATE)
MC	

## RECOVERY AIDS SPECIFICATIONS

MARKER ASSEMBLY - LOCATION MARINE

MC 901-0139 "B" & PDC 1, 2, 3, & 4

ME 901-0139 "D" (SPECIFICATION CONTROL DRAWING)

ME 434-0038 NC & PDC-1

LIGHT, FLASHING

ME 464-0095 NC & PDC 1 & 2

POWER SUPPLY

MA 0203-0341 PROCESS SPEC

FLASHING LIGHT & POWER SUPPLY

PREINSTALLATION, PREPARATION

& CHECKOUT, PROCEDURE FOR.

IMPACT

N O N E

APOLLO RELIABILITY  
CREW SAFETY SINGLE POINT FAILURE SUMMARY

SUBSYSTEM: Earth Landing

<u>EQUIPMENT DESCRIPTION</u>		<u>FAILURE MODE</u>
<u>NAME</u>	<u>PART NUMBER</u>	
Drogue & main chute riser attach disconnect assembly	V36-596002-11	1. Structural failure 2. Failure to release chutes
Drogue mortar orifice	R6968-13	1. Clogged
Pilot mortar orifice	R6048-5	1. Clogged
Drogue mortar cartridge	ME453-0005	1. Premature firing
Pilot mortar cartridge	ME453-0005	1. Premature firing

APOLLO RELIABILITY  
CREW SAFETY SINGLE POINT FAILURE SUMMARY

SUBSYSTEM: Impact

<u>EQUIPMENT DESCRIPTION</u>		<u>FAILURE MODE</u>
<u>NAME</u>	<u>PART NUMBER</u>	
Crew Couch Strut Assemblies		
X-X Foot	V16-571411	1. Structural failure at touchdown.
X-X Head	V16-571412	2. Core crush strength out of tolerance
Z-Z Axis	V16-571314	
Y-Y Axis	V16-571016	



SEQUENTIAL EVENTS CONTROL SUBSYSTEM  
(SECS)

- PURPOSE OF SUBSYSTEM SHALL BE TO PROVIDE  
AUTOMATED, SEMI-AUTOMATIC, OR MANUAL  
CONTROL DURING APOLLO MISSION, TO  
PERFORM FUNCTIONS RELATED TO LAUNCH ESCAPE,  
EARTH RECOVERY & SEPARATION FUNCTIONS  
WITHIN APOLLO SPACECRAFT
- REF: SID64-1344 BLK II TECHNICAL SPEC  
SID64-1345 BLK II MEI SPEC

THIS CHART ILLUSTRATES THE LEM DOCKING AND SEPARATION FUNCTIONS ADDED TO THE NORMAL MISSION BLOCK I FUNCTION. THE SUBSEQUENT CHARTS DEPICTING ABORT FUNCTIONS INDICATE NO ADDED BLOCK II REQUIREMENTS.

## NORMAL MISSION

- TOWER JETTISON
- CSM-ADAPTER SEPARATION
- ★ LEM DOCKING
- ★ LEM-SLA SEPARATION
- ★ LEM DOCKING
- ★ FINAL SEPARATION (LEM/CM)
- CM/SM SEPARATION
- APEX COVER JETTISON
- DEPLOY DROGUE CHUTES
- DISCONNECT DROGUE CHUTES & DEPLOY PILOT CHUTES
- RCS PROPELLANT BURN & SYSTEM PURGE
- DISCONNECT MAIN CHUTES

★ ADDED BLK II FUNCTIONS

## LES ABORT

- BOOSTER CUTOFF
- CM/SM SEPARATION
- RCS OXIDIZER DUMP (<42 SECONDS)
- CANARD DEPLOY
- TWR JETTISON
- APEX COVER DEPLOY
- DROGUE CHUTE DEPLOY
- MAIN CHUTE DEPLOY
- RCS PROPELLANT DUMP/BURN & PURGE

## SPS ABORT

- BOOSTER CUTOFF
- DIRECT ULLAGE - ON
- ADAPTER SEPARATION
- ENABLE RCS
- DIRECT ULLAGE - OFF

## SECS

## INTERFACES - SUBSYSTEMS

- EARTH LANDING
- REACTION CONTROL
- ELECTRICAL POWER
- EMERGENCY DETECTION
- TELECOMMUNICATIONS
- LAUNCH ESCAPE
- DISPLAYS & CONTROLS
- STABILIZATION & CONTROL
- GUIDANCE & CONTROL

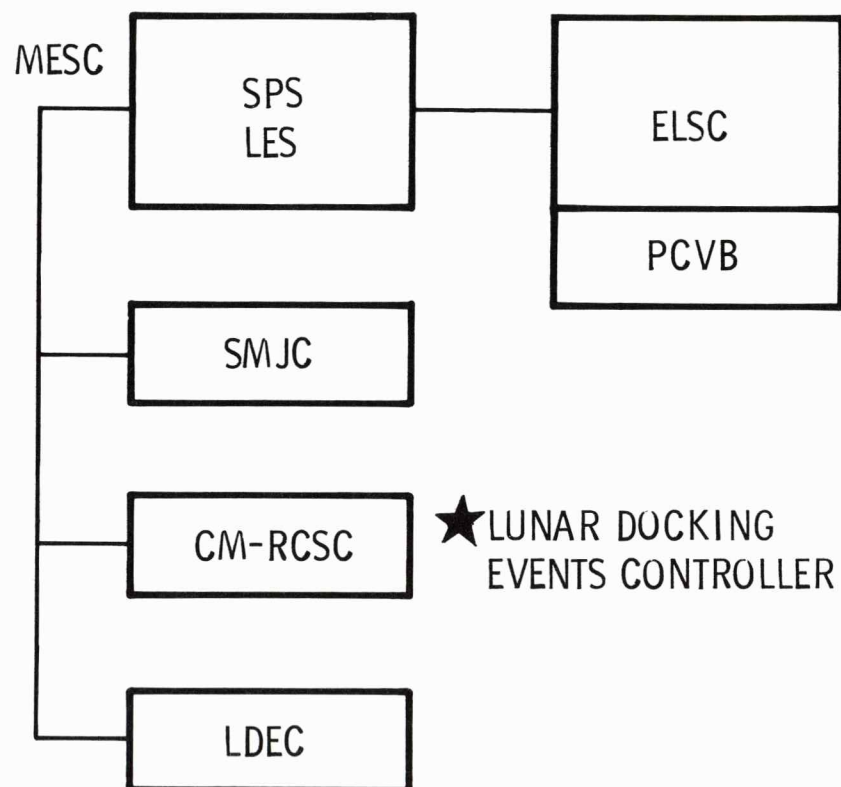
THE SECS IS A DUAL REDUNDANT SYSTEM WITH RELAY CONTACTS PROVIDING SYSTEM CROSSOVER FUNCTIONS. ILLUSTRATED HERE IS ONE HALF OF THE DUAL SYSTEM. THE NEW BLOCK II FUNCTIONS ARE LOCATED IN THE LDEC.

SINCE THE FUNCTIONS OF THE MESC, ELSC, PCVB, SMJC AND THE CM-RCSC ARE THE SAME AS BLOCK I (AFRM 012), THIS BRIEFING WILL BE SLANTED TOWARD THE EXPLANATION OF THE LDEC.

DETAILS OF THE ELECTRICAL INTERFACES BETWEEN THE SECS COMPONENTS AND BETWEEN THESE COMPONENTS AND THE SYSTEM MAY BE OBTAINED THROUGH EXAMINATION OF THE SCHEMATIC V34-945050. ADDITIONAL DETAILS OF THE EDS, WHICH HAS A MAJOR ELECTRICAL INTERFACE WITH THE SECS, MAY BE OBTAINED FROM SCHEMATIC V34-945049.



## BLOCK DIAGRAM - SECS



★ LUNAR DOCKING  
EVENTS CONTROLLER

★ ADDED BLOCK II COMPONENT

## BLOCK II ADDED FUNCTIONS

- LEM DOCKING

PROBE RETRACT (INITIAL & FINAL)

DOCKING RING SEPARATION

- LEM-SLA SEPARATION

- PITCH CONTROL MOTOR CUTOUT

BLOCK II ASSEMBLIES  
(NEW)

- LDEC (LUNAR DOCKING EVENTS CONTROLLER)

PROBE RETRACT (INITIAL & FINAL)

PITCH CONTROL MOTOR CUTOUT

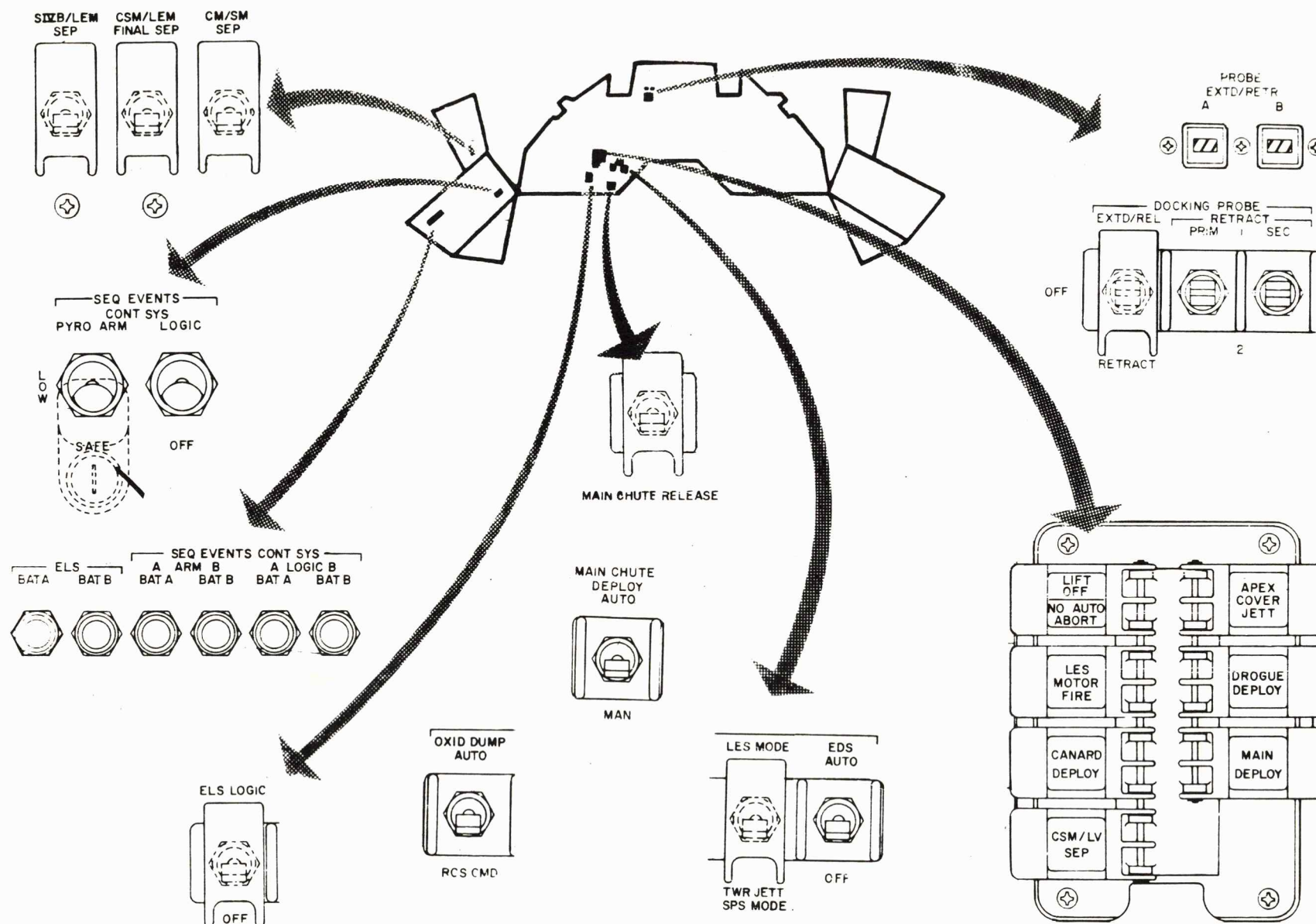
PYRO BUS ARM MOTOR SWITCH

FINAL SEPARATION (LEM/CM)

LEM-SLA SEPARATION

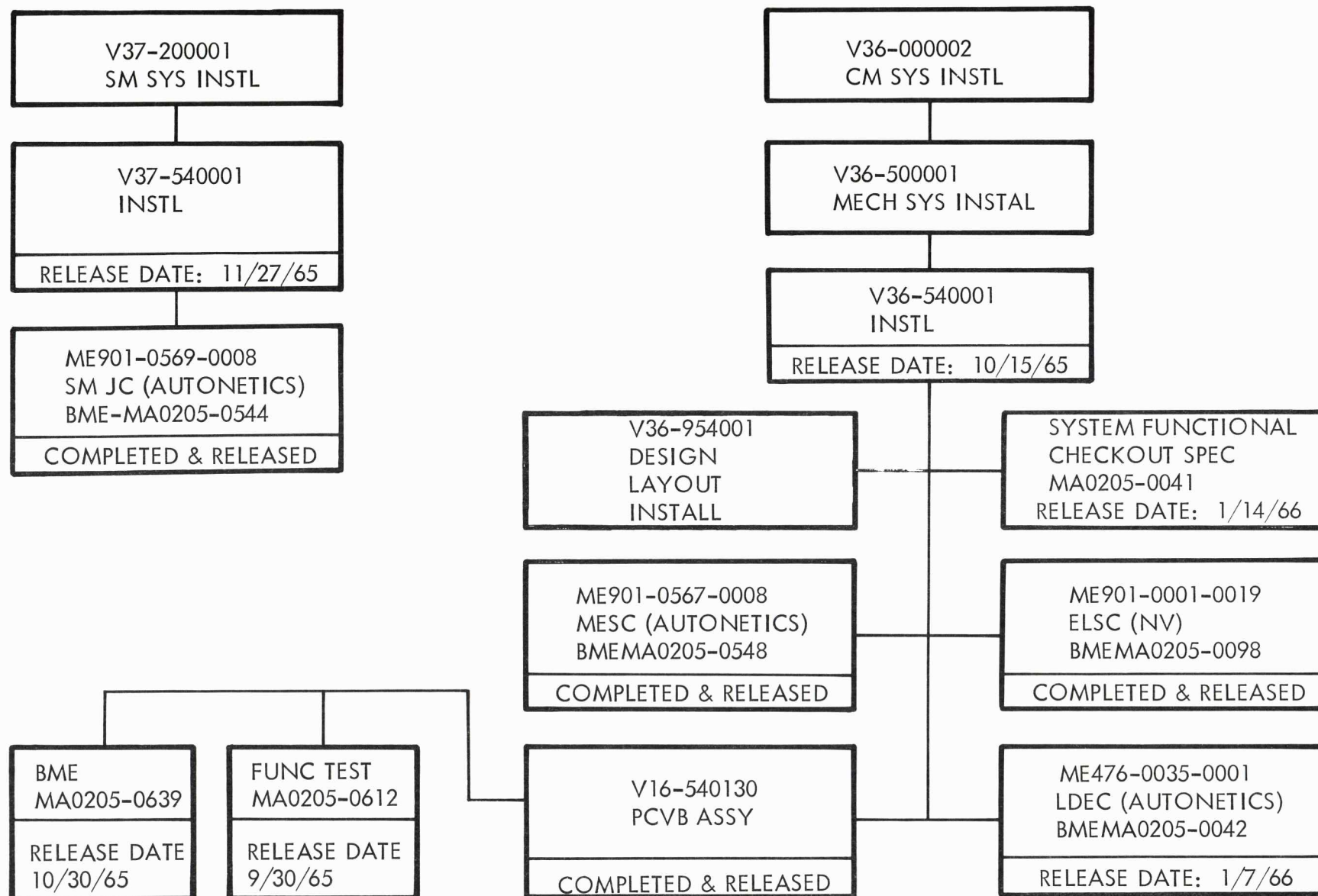
PORTIONS OF THE DISPLAY AND CONTROL PANELS SHOWN HERE ILLUSTRATE THOSE FUNCTIONS ASSOCIATED WITH THE SECS. EDC FUNCTIONS ARE COVERED IN THE PORTION OF THIS BRIEFING COVERING THE DISPLAY AND CONTROLS. THE RELATIONSHIP OF THE PANEL COMPONENT TO THE SYSTEM CIRCUITRY MAY BE OBTAINED THROUGH EXAMINATION OF THE SYSTEM SCHEMATIC.

# SEQUENTIAL EVENT CONTROL SYSTEM



THE TOP INSTALLATION AND ASSEMBLY DRAWINGS, THE SPECIFICATION CONTROL DRAWINGS AND CHECKOUT SPECIFICATIONS ARE SHOWN ON THIS CHART. A COMPLETE DOCUMENTATION TREE CAN BE OBTAINED IN THE APPENDIX.

## SECS DOCUMENTATION TREE





## SECS ICD'S

NO.	TITLE	STATUS
MH01-05059-214	CM-LEM UMBILICAL DOCKING CONFIGURATION - ELECT.	RELEASED
MH01-05212-224	SLA-LEM SEPARATION SYSTEM UMBILICAL - ELECT	RELEASED
MH01-05214-424	SLA-LEM SEPARATION SYSTEM- FUNCTIONAL	RELEASED

APOLLO RELIABILITY  
CREW SAFETY SINGLE POINT FAILURE SUMMARY

SUBSYSTEM: Sequencers

<u>NAME</u>	<u>EQUIPMENT DESCRIPTION</u>	<u>FAILURE MODE</u>
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No known crew safety single point failures

EIGHT OF THE TEN SECS COMPONENTS ARE LOCATED IN THE COMMAND MODULE; THE OTHER TWO IN THE SERVICE MODULE. THE GENERAL LOCATIONS ARE SIMILAR TO BLOCK I. LOCAL RELOCATION WAS ACCOMPLISHED TO AFFECT IMPROVED SPACE EFFICIENCY REQUIRED FOR BLOCK II CHANGES INCLUDING THE ADDITION OF THE LEDC.

## SEQUENCER

